MAR 30 1990

FEMI 709: 480035/90

FLOOD INSURANCE STUDY

BEXAR COUNTY, TEXAS
UNINCORPORATED AREAS

REVISED:
APRIL 2, 1990

Federal Emergency Management Agency

COMMUNITY NUMBER - **480035**

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision (LOMR) process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Flood Insurance Study Effective Date: October 16, 1984

Flood Insurance Study Revised: July 17, 1989
April 2, 1990

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Flood Boundary and Floodway Map

PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index
Flood Insurance Rate Map

FLOOD INSURANCE STUDY
UNINCORPORATED AREAS OF BEXAR COUNTY, TEXAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the unincorporated areas of Bexar County, Texas, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in their efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study represent a revision of the original analyses prepared by the U. S. Geological Survey (USGS), Water Resources Division, Austin, Texas, for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. IAA-H-20-74, Project Order No. 16. The work for the original study was completed in July 1977. A flood hazard analysis for the Helotes Creek watershed was published in March 1975 by the Soil Conservation Service (SCS) (Reference 1). The data and results from this analysis were used in the present study. Portions of eight U. S. Army Corps of Engineers (COE) reports on flooding sources in Bexar County were used where they covered areas being prepared in this study (References 2, 3, 4, 5, 6, 7, 8, and 9).

For this revision, a tabulation follows that specifies the revised streams and the location of the revision (with a number/letter designation used for purposes of this revision), the engineering firm that performed the technical analyses for the revision, and the completion date for each revision:

Number/Letter Designation, Stream Name, and Location	Engineering Firm	Completion Date
1. SLICK RANCH CREEK		
a. From Loop 410 to Potranco Road	Civil Engineering Consultants	1/22/86
b. From Potranco Road to approximately 4,250 feet upstream of Potranco Road	Pape-Dawson Engineers	11/87
2. PANTHER SPRINGS CREEK		
a. From approximately 350 feet downstream of Bitters Road to approximately 3,800 feet downstream of Bitters Road	Pape-Dawson Engineers	11/01/85
b. From approximately 350 feet downstream of Bitters Road to approximately 2,400 feet upstream of Bitters Road	Vickrey & Associates	6/87
3. TRIBUTARY TO PANTHER SPRINGS CREEK		
a. From Vista del Norte Road to a point approximately 1,050 feet downstream	Pape-Dawson Engineers	1/26/86
b. From its confluence with Panther Springs Creek to a point approximately 3,700 feet upstream	Pape-Dawson Engineers	11/01/85
4. ACKERMAN CREEK		
From approximately 370 feet downstream of Benz-Engleman Road to a point approximately 3,000 feet downstream	Civil Engineering Consultants	3/25/86
5. FRENCH CREEK		
From approximately 900 feet upstream of Mainland Drive to approximately 1,500 feet downstream of Mainland Drive	M. W. Cude and Associates	1/24/86
6. TRIBUTARY TO FRENCH CREEK		
From Low Bid Circle Road to a point approximately 3,500 feet upstream	M. W. Cude and Associates	5/19/86

Number/Letter Designation, Stream Name, and Location	Engineering Firm	Completion Date
7. LEON CREEK		
a. From approximately 600 feet downstream of Ingram Road to approximately 1,550 feet upstream of Ingram Road	Pape-Dawson Engineers	11/19/86
b. From approximately 1,400 feet downstream of West Prue Road to approximately 150 feet upstream of Babcock Road	W. F. Castella & Associates, Inc.	2/19/87
c. From approximately 5,200 feet downstream of Bandera Road to the downstream side of Bandera Road	M. W. Cude and Associates, Inc.	12/87
8. TRIBUTARY A OF CULEBRA CREEK		
a. From Dover Ridge Culvert to a point approximately 1,700 feet downstream	Macina, Bose, Copeland, and Associates, Inc.	7/29/86
b. From Tezel Road bridge to a point approximately 600 feet upstream	M. W. Cude and Associates, Inc.	11/88
9. UNNAMED TRIBUTARY OF ELM WATERHOLE CREEK		
From 650 feet upstream of Misty Glade to approximately 200 feet downstream of Misty Glade	Camarillo & Associates, Inc.	7/21/86
10. UNNAMED TRIBUTARY		
From Lookout Road to the City of Selma corporate limits	Macina, Bose, Copeland, and Associates, Inc.	7/87
11. MEDIO CREEK		
From U. S. Route 90 to a point approximately 3.07 miles upstream	W. F. Castella & Associates, Inc.	12/87
12. CIBOLO CREEK		
From U. S. Route 90 to the Kendall county boundary	C. A. Bolner & Associates, Dewberry and Davis Fort Worth District COE K. M. Ng & Associates, Inc.	7/87

Number/Letter Designation, Stream Name, and Location	Engineering Firm	Completion Date
13. BALCONES CREEK From its confluence with Cibolo Creek to a point approximately 1.6 miles upstream	C. A. Bolner & Associates	7/87
14. HUEBNER CREEK From the City of San Antonio corporate limits to a point approximately 700 feet upstream	Pape-Dawson Engineers	11/19/86
15. SALADO CREEK a. From approximately 1.70 miles upstream of Blanco Road to approximately 2,000 feet upstream of Blanco Road	Pape-Dawson Engineers	11/17/87
b. From approximately 2,000 feet downstream of Blanco Road to approximately 1.65 miles upstream of Blanco Road	Dewberry and Davis	12/87
16. WEST FORK OLMOS CREEK From approximately 45 feet downstream of De Zavala Road to approximately 2,390 feet upstream of Red Maple Wood Lane (in vicinity of Woods of Shavano project).	Pape-Dawson Engineers	1/15/88
17. CULEBRA CREEK From a point approximately 7,400 feet above the confluence of Tributary A of Culebra Creek to a point approximately 1,400 feet downstream of the FM 471 bridge	M. W. Cude and Associates, Inc.	11/88

1.3 Coordination

In April 1974, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, Bexar County, and the USGS (the study contractor) to identify the streams to be

studied by detailed methods. A written request was made to the SCS for data concerning a flood hazard study on Helotes Creek that was published in 1975 (Reference 1).

A meeting was held in April 1976 with officials of the San Antonio River Authority, the City of San Antonio, Bexar County, and the USGS. The purposes of this meeting was to coordinate the preparation of the county report with the Flood Insurance Study being prepared for the City of San Antonio and other incorporated areas within the county.

The SCS provided surveyed cross sections, drainage areas, and roughness coefficients for Salitrillo and Martinez Creek study reaches (Reference 10). The Texas Department of Highways and Public Transportation provided bridge plans, bench mark elevations, and high-water elevation information. High-water marks were also supplied by the Bexar County Road Department along with current map information. Contact was established with the San Antonio River Authority to minimize all possible conflicts.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Bexar County, Texas. The following incorporated towns or cities (corporate limits as of June 1974) were not included in this study: Alamo Heights, Balcones Heights, Castle Hills, China Grove, Converse, Elmendorf, Grey Forest, Hill Country Village, Hollywood Park, Kirby, Leon Valley, Live Oak, Olmos Park, San Antonio, Selma, Shavano Park, Somerset, St. Hedwig, Terrell Hills, Universal City, and Windcrest. The area of study is shown on the Vicinity Map (Figure 1).

The following streams were studied by detailed methods: West Fork Olmos Creek, Olmos Creek, Martinez Creek, Salitrillo Creek, West Salitrillo Creek, Calaveras Creek, Indian Creek, Medio Creek, Caracol Creek, Slick Ranch Creek, Helotes Creek, Los Reyes Creek, and Culebra Creek. Detailed study information was added for the San Antonio River, Leon Creek, Huesta Creek, Salado Creek, French Creek, Huebner Creek, and Mud Creek from the Flood Insurance Study for the City of San Antonio. Detailed study for Cibolo Creek was added from the Flood Insurance Studies for the unincorporated areas of Comal and Guadalupe Counties. Detailed study for Rosillo Creek was added from the Flood Insurance Study for the City of Kirby. Detailed study for Tributary A of Culebra Creek was added from information submitted for the Great Northwest subdivision. Detailed study for Balcones Creek was added from information submitted for the Fair Oaks Subdivision. Detailed study for three shallow flooding areas was added from the Flood Insurance Study for the City of Elmendorf. All streams studied in detail, in the opinion of local officials, exhibited a clear and present flood danger with a lack of flood control works coupled with intense pressure to develop the floodplain.

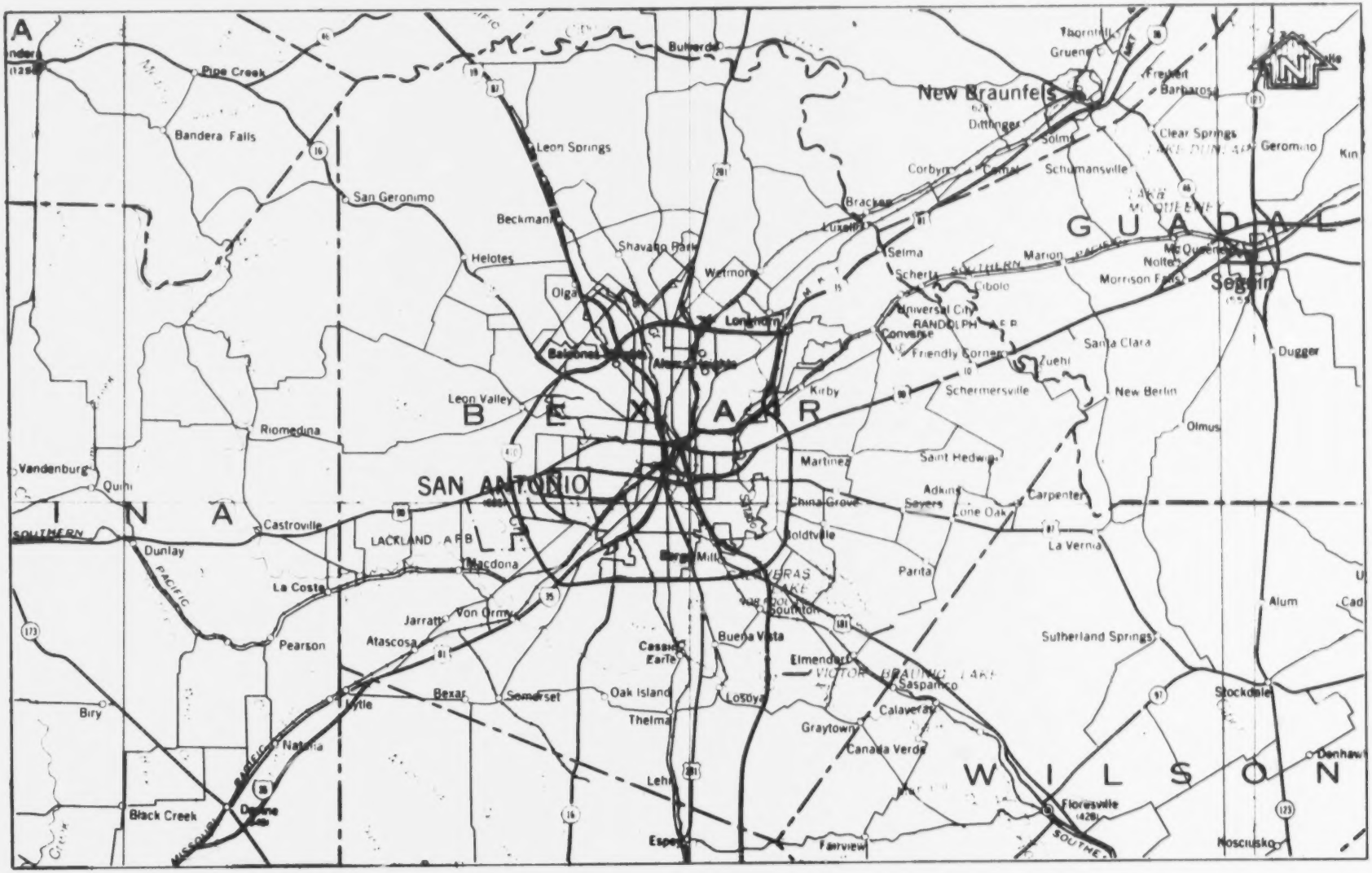


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

APPROXIMATE SCALE

8 0 8 16 24 MILES

VICINITY MAP

There are two Martinez Creeks within the county boundary, with one inside the corporate limits of San Antonio and one located in this study in eastern Bexar County. Two spellings of Salitrillo Creek are used, with the USGS and the county using Salitrillo, while other sources were noted to use Salatrillo; the former spelling will be used in this study. East Fork Olmos Creek was renamed Olmos Creek in order to match the Flood Insurance Study for the City of San Antonio.

Streams designated as 1., 2a., 2b., 4., 5., 7b., 8b., 9., 11., and 16. were revised to incorporate updated hydraulic and topographic data. Streams designated as 3a., 3b., 6., 7a., 8a., 10., 12., 13., 14., 15a., and 15b. were revised to incorporate updated hydrologic, hydraulic, and topographic data. The stream designated as 17. was revised to incorporate updated topographic data.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

Portions of the Medina River and the San Antonio River were studied by approximate methods. Various tributaries located in Bexar County, lacking development pressure, were also studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Unincorporated areas of Bexar County.

2.2 Community Description

Bexar County is located in south-central Texas. The county, with its major city San Antonio, has been a cultural and economic center since the early 1700's. It is conveniently located among Austin (75 miles), Houston (190 miles), Dallas (255 miles), the Rio Grande Valley, and the International border with Mexico. It is also crossed by major interstate transportation routes, which include the Southern Pacific, Missouri Pacific, and Missouri-Kansas-Texas Railroads; U. S. Highways 81, 87, 90, 181, and 281; and Interstate Highways 35 and 10. Besides the City of San Antonio, the county contained 20 other smaller incorporated areas in 1974.

Even though the civil administration was organized in 1837, the county achieved its present outline in 1860. It covers an area of 1,248 square miles. Today, the urban area contains mostly residential developments grouped around industrial and military complexes. The rural areas of the county consist mostly of farms, with an average size of 296 acres (Reference 11). More than half of the acreage of these farms is rangeland. Livestock, mainly beef cattle, and grain crops of corn and sorghum provide the major source of agricultural income.

Development in the floodplains of Bexar County is proceeding rapidly as the population grows and farms and ranches are being converted into suburban commuter areas. This land use change is accelerating rapidly, with the potential for both loss of life and large scale property loss increasing. There is little awareness of this region's flooding potential among either the home-buying public or the developer-builder.

All streams flowing through Bexar County drain into the San Antonio River basin. Major streams in the county are the San Antonio River, the Medina River, and Cibolo Creek. Secondary streams in the county include Elm Creek, Leon Creek, Salado Creek, Martinez Creek, and Calaveras Creek. Flow patterns are dependent on the stream's location to the fault system. Those south of the fault system have relatively mild slopes; wide, flat floodplains; and flow in a northwest to southeast direction. Those north of or crossing the fault have steep slopes; narrow or no floodplains; and losing reaches, meaning sections of some streams flowing through limestone areas of Bexar County where discharges decrease as drainage areas increase, and flow in a general north to south direction. The loss of surface water provides a significant source of recharge to ground water aquifers that supply many springs and wells.

A list of the flooding sources in Bexar County studied in detail and the maximum drainage areas achieved within the county are shown in the following tabulation:

Flooding Source	Drainage Area (in square miles)
West Fork Olmos Creek	5.3
Olmos Creek	6.9
Martinez Creek	87.5
Salitrillo Creek	30.2
West Salitrillo Creek	8.9
Calaveras Creek, above Trip Trees (Martinez) Road	1.83
Indian Creek	10.5
Medio Creek	53.7
Caracol Creek	7.3
Slick Ranch Creek	10.4
Helotes Creek	33.1
Los Reyes Creek	9.2
Culebra Creek	82.5
Rosillo Creek	7.9
Huesta Creek	3.7
Salado Creek	35.0
French Creek	5.6
Leon Creek	198.0
Huebner Creek	12.0
Mud Creek	57.2
San Antonio River	75.6
Tributary A of Culebra Creek	3.3
Cibolo Creek	309.0
Balcones Creek	24.44

Bexar County has a modified subtropical climate, predominantly continental during the winter months and marine during the summer months. Normal mean temperatures range from 50.7 degrees Fahrenheit (^{o}F) in January to a high of 84.7^{o}F in July, with a yearly mean of 69.1^{o}F (Reference 12). While the summer is hot, with daily maximum temperatures of approximately 90^{o}F over 80 percent of the time, extremely high temperatures are rare, with a record high of 107^{o}F. Mild weather prevails during much of the winter months, with below freezing temperatures occurring on an average of approximately 20 days each year. The normal annual precipitation is 27.54 inches. Precipitation is fairly well distributed throughout the year, with the heaviest amounts during May and September. Precipitation from April to September usually occurs with thunderstorms with fairly large amounts falling in short periods of time. Most of the winter precipitation occurs as light rain or drizzle. However, thunderstorms may occur any time of the year. During the winter, northerly winds prevail but become southeasterly from the Gulf of Mexico during the summertime.

The Balcones Fault Zone cuts across the northern third of the county in a northeast-southwest trend. This zone forms a transitional boundary separating the hill country of the Edwards Plateau to the north from the Blackland Prairie to the south. The Edwards Plateau is a rugged, hilly area that ranges from 1,100 to 1,900 feet in elevation. The topography is characterized by steeply sloping, stair-stepped, rocky valley walls and deep incised stream channels. Hill slopes vary from 5 to 12 percent. Soils in this area are shallow limey clay soils of the Tarrant-Brackett and Crawford-Bexar Associations (Reference 10). These soils overlay the limestones and marls of the Glen Rose Formation and Edwards Limestone. The Blackland Prairie is a gently undulating terrain with hill slopes of 1 to 5 percent. Elevations change from 450 to 1,000 feet, with a general slope to the south. The soils are deep clays, clay loams, and sandy loams, which overlay the Taylor and Navarro Group (Reference 10).

2.3 Principal Flood Problems

Bexar County lies in the center of a special climatic zone influenced by the Balcones Fault scarp. Humid southerly winds off the Gulf of Mexico strike the 500 to 800 foot face of the scarp and are lifted orographically to produce intense localized rainfall. This process is aided by frequent cold fronts (northers) and occasional tropical cyclones (hurricanes), especially in the months of August and September. This combination of climatic and physiographic factors has produced some of the most intense rainstorms ever recorded in the conterminous United States (Reference 13). Some of these intense rainstorms include 36.4 inches measured in 18 hours at Thrall in September 1921 and 22.0 inches in 2 hours 45 minutes at D'Hanis in May 1935 (Reference 13). A 15-inch rainfall is no longer considered rare, and it is not unheard of to have a 20-inch rainfall.

San Antonio, developed longer and with better records than rural Bexar County, has recorded disastrous floods in 1921, 1946, and 1965 (References 13, 14, and 15). Other major storms occurred in 1819, 1865, 1880, 1893, 1899, 1913, 1919, 1923, 1935, 1957, 1958, and 1972. All of the storms had effects on rural Bexar County as exhibited in 1946 when Calaveras Creek in southeast Bexar County had a record flood.

2.4 Flood Protection Measures

The SCS has three basin projects within Bexar County that have some flood control purpose. The Calaveras Creek project in southeast Bexar County has 10 floodwater retaining structures constructed, of which four have either been removed or flooded by the backwater from the Calaveras Power Lake. The six remaining structures have a total capacity of 6,770 acre-feet and control the drainage from 20.5 square miles with a 25-year design spill frequency. The SCS has also constructed several flood control dams in the Salado Creek watershed controlling a drainage area of 36.3 square miles with a total capacity of 13,750 acre-feet. Their effects have not been incorporated into this Flood Insurance Study at this time. They were designed with an overflow probability of 1 percent chance per year. The Martinez Creek system has six retaining structures controlling 28.9 square miles with a total capacity of 8,825 acre-feet and has a design overflow frequency averaging 4 percent chance per year. Both Salitrillo Creek and West Salitrillo Creek have undergone extensive geometry modification in the reaches bordering the City of Converse.

Two reservoirs located in southern Bexar County that were constructed primarily for cooling of electric power generating plants have limited storage capacity for floodwaters. Victor Brauning Lake is located on Arroyo Seco and has a normal storage of 26,500 acre-feet and 9.4 square miles of drainage area above the dam, which has 3,500 acre-feet of flood storage. Calaveras Lake is located on Calaveras Creek and has a normal capacity of 62,800 acre-feet and 65 square miles of drainage area above the dam, which has 18,900 acre-feet for flood storage.

Within the City of San Antonio, many miles of natural channel have been rectified, and Olmos Dam, on the headwaters of the San Antonio River, has been constructed. Olmos Dam has storage of 15,500 acre-feet, all of which is for floodwaters.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-,

and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

A search of the Flood Plain Information reports prepared by the COE and the Flood Hazard Analyses report prepared by the SCS yielded a pair of flood frequency discharge-drainage area curves ranging from 1 to 70 square miles of drainage area (References 2, 3, 4, 5, 6, 7, 8, 9, and 1). Flood frequencies are published as the Intermediate Regional Flood, which is defined as one that has 1 percent chance of occurring in a given year; and the Standard Project Flood, which is defined as a flood of such magnitude that is expected to be a reasonable upper limit of meteorologic and hydrologic conditions.

All available peak flood discharges in the area of the Balcones Fault Zone were plotted along with three other work curves for comparison (References 16, 17, 18, 19, 20, 21, and 22). The Jarvis-Meyer 100-percent runoff curve is a theoretical maximum possible runoff per square mile of drainage (Reference 23). This has been exceeded in the Bexar County area. The provisional Texas maximum runoff curve is empirically derived from observed peak flows.

Based on the frequency that floods greatly exceed the COE Standard Project Flood, a 500-year frequency curve was drawn higher than the COE curve, and the lower end of the COE 100-year curve (from 1 to approximately 7 square miles) was raised to reflect the peak flows.

The 10- and 50-year curves used in this study were then established parallel to the 100- and 500-year curves. The discharges used on the San Antonio River, Leon Creek, Salado Creek, and Culebra Creek were based on the 100-year frequency discharge-drainage area design curve recommended by the City of San Antonio and developed by the USGS.

A comparison was made between the peak discharges produced by the above method and the subsequently published Schroeder-Massey technique report (Reference 24). Results of this comparison showed a high level of compatibility between the two methods.

The hydrologic analysis for the streams designated 3a., 3b., 6., 7a., 8a., and 14. were updated using the Rational Formula for computing flood discharges. Flood discharges for revision 10. used Technical Paper No. 40 (Reference 25). The hydrologic analysis for revision 12. was determined from a log-Pearson Type III analysis and regionalized equations (Reference 26); this revision also involved hydrologic data obtained from the Flood Insurance Studies for the unincorporated areas of Comal and Guadalupe Counties (References 27 and 28). The data used in the Comal County Flood Insurance Study precedes the Guadalupe County study by approximately 10 years. Due to the change in hydrologic conditions that occur over time, the discharges for the Comal County study are higher than those for the Guadalupe study; therefore, the discharges used in this study are disproportionately higher for Cibolo Creek adjacent to Comal County when compared to Guadalupe County. This determination was based on the best technical data available for this area. The 10-, 50-, and 100-year discharges for revision 13. were determined using discharge frequency curves from the Texas State Department of Highways and Public Transportation Hydraulic Manual (Reference 29); the 500-year flood profile was determined using the SCS Technical Release No. 55 graph method (Reference 30).

It should be noted that discharges on Cibolo Creek increase with decreasing drainage area. This phenomenon is caused by a loss of water starting just below Boerne in Kendall County and continuing downstream to Interstate Highway 10. This area has outcrops of massive cavernous limestone of the Cretaceous Period. The water is, in effect, stored in caverns underground and never reaches downstream points as flood flows.

A summary of the drainage area-peak discharge relationships for the flooding sources studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
WEST FORK OLMOS CREEK					
At Huebner Road	2.70	3,000	4,050	4,700	5,800
At De Zavala Road	1.30	2,100	2,880	3,300	4,040
OLMOS CREEK					
At George Road	6.90	5,840	8,400	9,580	12,400
At cross section B	4.10	5,130	7,200	8,200	10,300
At De Zavala Road	3.80	4,400	5,960	6,770	8,080
At cross section F	2.70	3,450	4,660	5,260	6,320
At cross section H	1.80	975	1,300	1,400	1,780
At Farm Market 1604	0.70	560	743	843	1,020

TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
MARTINEZ CREEK					
At Schuwirth Road	14.30	2,000	5,900	8,400	18,000
At cross section D	9.60	1,183	1,800	2,600	5,500
At cross section H	8.90	713	1,100	1,279	1,730
At Martinez Creek Dam #1	6.30	61	250	319	480
WEST SALITRILLO CREEK					
At cross section A	6.10	2,200	3,290	4,000	7,320
At Farm Market 1516	5.50	2,000	2,970	3,600	6,600
At Cross Section G	4.80	1,500	2,270	2,700	5,400
At Farm Market 1976	4.10	1,000	1,470	1,800	4,200
CALAVERAS CREEK					
At U. S. Route 87	3.25	1,250	3,650	5,300	11,200
At Cross Section D	1.50	700	2,080	2,950	6,150
At Farm Market 1516	0.76	420	1,400	1,720	3,610
INDIAN CREEK					
At mouth	9.90	2,930	8,300	12,100	25,000
At Interstate Route 410	5.90	1,975	5,750	8,400	17,500
MEDIO CREEK					
At U. S. Route 90	36.90	5,750	15,900	26,700	48,300
At cross section B	32.30	5,430	15,100	22,600	47,000
At Farm Market 1604	22.30	4,580	12,800	18,500	38,200
At Talley Road	16.90	3,990	11,200	16,200	33,300
CARACOL CREEK					
At confluence with Medio Creek	7.20	1,850	5,400	7,900	16,500
SLICK RANCH CREEK					
At Interstate Route 410	8.60	2,800	8,000	11,400	23,600
At cross section C	6.10	1,700	4,900	7,360	15,000
HELOTES CREEK					
At Farm Market 1604	31.1	14,600*	23,200*	27,500*	37,400*
At Braun Road	29.4	15,000	24,100	28,700	38,900
At State Route 16	15.0	8,400	13,200	15,500	20,800

*Peak discharges attenuated due to losing reaches

TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
LOS REYES CREEK					
At State Route 16 at B	5.4	3,500*	5,690	6,780	9,260
At State Route 16 at D	4.6	3,530	5,600	6,600	8,870
CULEBRA CREEK					
At Farm Market 1957	81.00	11,500	31,000	46,000	99,000
At Cross Section S	77.00	7,720	21,400	31,800	66,500
At Farm Market 1604	41.00	6,000	16,600	24,500	50,500
At Farm Market 1560	26.00	4,900	13,700	20,000	41,400
At Galm Road	3.50	1,320	3,860	5,590	13,800
ROSILLO CREEK					
Upstream of confluence of West Tributary of Rosillo Creek	7.9	4,872	8,745	10,943	18,305
At Old Seguin Road	3.4	2,689	4,860	6,860	10,601
HUESTA CREEK					
Approximately 2,000 feet upstream of Loop 1604	3.7	1,360	3,900	5,900	12,400
SALADO CREEK					
Approximately 2,200 feet upstream of confluence of Panther Springs Creek	35.5	12,200	17,300	19,300	58,000
FRENCH CREEK					
Approximately 1,000 feet downstream of Hausman Road	5.6	1,920	5,400	8,200	17,250
LEON CREEK					
900 feet upstream of confluence of Culebra Creek	77.0	11,000	31,000	46,000	96,500
Just upstream of Bandera Highway	62.0	9,500	26,000	40,615	83,000

*Peak discharges attenuated due to losing reaches

TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
HUEBNER CREEK					
Approximately 900 feet upstream of Ingram Road	12.0	3,200	9,100	13,000	27,500
MUD CREEK					
At Star Crest Drive	57.2	6,800	19,200	28,300	60,000
SAN ANTONIO RIVER					
Approximately 2,400 feet downstream of Interstate Route 410	75.6	11,000	30,000	45,000	96,000
TRIBUTARY A OF CULEBRA CREEK					
Just upstream of Timberwilde Drive	2.6	1,050	3,000	4,400	9,200
CIBOLO CREEK					
At Frontage Road	309.0	28,200	53,000	67,000	107,000
Low water crossing at stream mile 79.7	286.2	35,900	59,600	75,300	105,000
At Selma Road	283.4	34,500	64,300	81,300	124,000
At Selma stream gage	274.0	36,800	68,500	86,500	141,000
At Lookout Road	269.6	27,208	77,955	108,466	196,676
At Missouri-Kansas-Texas Railroad	269.3	27,154	77,817	108,300	196,349
At confluence of Bracken Tributary and Garden Ridge Tributary	263.9	26,284	75,597	105,635	191,096
Downstream of Missouri-Pacific Railroad	263.8	26,156	75,270	105,241	190,322
At cross section F	259.1	25,533	73,673	103,318	186,538
At cross section M	252.4	24,471	70,942	100,012	180,053
Downstream of confluence of West Fork Tributary	248.5	23,877	69,407	98,147	176,401
Upstream of confluence of West Fork Tributary	241.1	22,726	66,425	94,507	169,292
At cross section AA	238.1	22,271	65,239	93,052	166,459
Downstream of FM 1863	234.7	21,754	63,892	91,397	163,239

TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
CIBOLO CREEK (continued)					
At cross section AH	233.6	21,594	63,474	90,882	162,238
Upstream of confluence of Louis Creek	205.6	17,499	52,648	77,371	136,170
At cross section AO	203.8	17,240	51,954	76,493	134,488
At cross section AQ	200.2	16,735	50,598	74,722	131,198
Upstream of U. S. Route 281	192.0	15,603	47,542	70,867	123,760
At confluence of Indian Creek	191.4	15,519	47,315	70,576	123,206
At cross section BB	177.1	13,585	42,034	63,741	110,278
At Specht Road	164.6	11,964	37,541	57,832	99,199
At Blanco Road	153.3	10,543	33,549	52,499	89,285
Upstream of Camp Bullis Military Reservation	115.8	6,233	21,020	35,107	57,622
At confluence of Cibolo Tributary	112.2	6,194	20,905	34,942	57,327
At cross section BM	102.0	4,826	16,745	46,568	*
BALCONES CREEK					
Upstream of confluence with Cibolo Creek	24.44	6,250	13,500	18,000	22,800

*Data not available.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the backwater analyses for the streams studied by detailed methods were field surveyed. Cross sections were located at close intervals above bridges and culverts in order to compute the backwater effects of those structures. All surveying was done by the USGS except for Olmos Creek, which was done by the COE, and Salitrillo, Martinez, and Helotes Creeks with its tributaries, which was done by the SCS.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments

for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2). Along certain portions of Leon Creek, a profile base line is shown on the maps to represent channel distances as indicated on the flood profiles and floodway data tables.

Water-surface elevations of floods of the selected recurrence intervals were computed using the USGS step-backwater computer program. Water-surface elevations for all of the streams updated in this revision were revised using the COE HEC-2 step-backwater computer program except for revisions 3a., 6., and 10., which were studied by approximate hydraulic methods (Reference 31). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Starting water-surface elevations for all streams except West Fork Olmos Creek were developed by the slope/area method. The starting elevations for West Fork Olmos Creek were taken at the upper limit of a COE Flood Plain Information report.

Roughness coefficients (Manning's "n") were assigned on the basis of field inspection. Channel "n" values ranged from 0.045 to 0.055, and the overbank "n" values ranged from 0.060 to 0.065.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing floodplain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the flooding sources studied in detail in the original study, the 100- and 500-year floodplain boundaries have been delineated using topographic maps at a scale of 1:24,000 with a contour interval of 10 feet (Reference 32).

In this revision, the following topographic maps were used to delineate the updated flood boundaries:

Revision Designation	Maps Used to Delineate Revised Flood Boundaries
1a.	Scale 1:2,400, Contour Interval 2 Feet (Reference 32).
1b.	Scale 1:2,400, Contour Interval 2 Feet (Reference 33)
2a.	Scale 1:2,400, Contour Interval 2 Feet (Reference 34).
2b.	Scale 1:600, Contour Interval 2 Feet (Reference 35).
3a.	Scale 1:2,400, Contour Interval 2 Feet (Reference 36).
3b.	Scale 1:2,400, Contour Interval 2 Feet (Reference 34).
4.	Scale 1:1,200, Contour Interval 1 Foot (Reference 37).
5.	Scale 1:2,400, Contour Interval 2 Feet (Reference 38).
6.	Scale 1:2,400, Contour Interval 2 Feet (Reference 39).
7a.	Scale 1:1,200, Contour Interval 2 Feet (Reference 40).
7b.	Scale 1:6,000 (Reference 41).
7c.	Scale 1:2,400, Contour Interval 1 Foot (Reference 42).
8a.	Scale 1:1,200, Contour Interval 2 Feet (Reference 43).
8b.	Scale 1:600 (Reference 44).
9.	Scale 1:1,200, Contour Interval 2 Feet (Reference 45).
10.	Scale 1:1,200, Contour Interval 1 Foot (Reference 46).
11.	Scale 1:12,000 (Reference 47).
12.	Scale 1:4,800, Contour Interval 2 Feet; Scale 1:12,000, Contour Interval 10 Feet; and Scale 1:12,000, Contour Interval 4 Feet (References 48, 49, and 50).
13.	Scale 1:4,800, Contour Interval 2 Feet (Reference 48).
14.	Scale 1:1,200, Contour Interval 2 Feet (Reference 40).
15a.	Scale 1:2,400, Contour Interval 1 Foot (Reference 51).
15b.	Scale 1:4,800, Contour Interval 4 Feet (Reference 52).
16.	Scale 1:1,200, Contour Interval 2 Feet (Reference 53).
17.	Scale 1:720, Contour Interval 2 Feet (Reference 54).

For the streams studied by approximate methods, the 100-year flood boundaries were delineated using USGS flood-prone area maps and the previous Flood Insurance Study for the unincorporated areas of Bexar County (References 55 and 56).

The 100- and 500-year floodplain boundaries are shown on the Flood Boundary and Floodway Map (Exhibit 2). In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself.

One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the floodplain. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 2). Portions of the floodway widths for West Fork Olmos Creek, Olmos Creek, Martinez Creek, West Salitrillo Creek, Culebra Creek, Rosillo Creek, and Cibolo Creek extend beyond the county boundary.

A special set of conditions was found on West Fork Olmos Creek between Huebner and De Zavala Roads where the stream channel has filled with silt carried out of a gravel washing plant. The channel slope has been raised to the point that water is flowing at critical velocities. At the Huebner Road crossing, critical velocities occur as well as at the upper end of this study reach.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
West Fork Olmos Creek								
A	14,290[1]	78	452	10.4	911.2	911.2	911.2[5]	0.0
B	15,940[1]	160[3]	959	4.9	923.5	923.5	924.5	1.0
C	18,820[1]	567	1,265	2.6	933.4	933.4	933.4	0.0
D	19,750[1]	184	810	4.1	939.6	939.6	939.6	0.0
E	20,860[1]	100	423	7.8	947.8	947.8	947.9[5]	0.1
F	22,360[1]	209	293	8.1	963.4	963.4	963.4[5]	0.0
Olmos Creek								
A	54,750[2]	171[4]	840	9.8	881.7	881.7	881.7	0.0
B	60,300[2]	159	1,136	6.0	915.0	915.0	916.0	1.0
C	62,510[2]	110	1,070	6.3	925.7	925.7	926.5	0.8
D	62,620[2]	134	1,442	4.7	927.2	927.2	928.2	1.0
E	66,480[2]	82	645	8.2	943.3	943.3	943.9	0.6
F	67,900[2]	126	798	6.6	951.3	951.3	952.3	1.0
G	69,110[2]	75	222	6.6	961.2	961.2	962.1	0.9
H	70,300[2]	62	152	6.4	973.7	973.7	974.5	0.8
I	71,100[2]	65	231	3.6	978.9	978.9	979.9	1.0

[1]Feet above mouth
[2]Feet above Olmos Dam
[3]This width extends beyond county boundary
[4]Floodway located outside county boundary
[5]Elevation not computed due to supercritical flow

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

WEST FORK OLMOS - OLMOS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Martinez Creek								
A	69,150	577	3,141	2.7	601.2	601.2	602.2	1.0
B	74,298	370	2,412	3.5	608.6	608.6	609.6	1.0
C	79,050	594	2,556	2.1	616.7	616.7	617.7	1.0
D	85,912	569	1,252	2.1	627.0	627.0	628.0	1.0
E	88,462	211	856	2.1	629.8	629.8	630.8	1.0
F	89,012	147[2]	671	2.7	630.5	630.5	631.4	0.9
G	89,577	384	1,476	1.2	631.2	631.2	631.8	0.6
H	91,177	110	332	3.9	634.1	634.1	634.5	0.4
J	91,877	122	432	3.0	635.7	635.7	636.2	0.5
K	93,677	519	925	1.4	637.8	637.8	638.5	0.7
L	94,612	430	1,723	0.7	640.1	640.1	640.7	0.6
M	96,212	100	217	2.8	641.6	641.6	641.9	0.3
N	97,012	47	124	4.9	646.5	646.5	646.7	0.2
West Salitrillo Creek								
D*	7,450	230	930	3.6	651.9	651.9	652.7	0.8
E*	8,150	140	510	6.5	656.2	656.2	657.2	1.0
F*	8,400	320	1,950	1.7	661.7	661.7	662.7	1.0
G*	10,450	90	360	7.4	665.8	665.8	666.5	0.7
H*	11,100	130	580	4.6	670.2	670.2	670.7	0.5
I*	12,860	130	260	8.8	680.0	680.0	680.1	0.1
J	14,800	170[3]	570	3.1	694.8	694.8	695.8	1.0
K*	15,200	150	400	4.5	697.4	697.4	697.9	0.5
L*	17,050	80	180	1.3	706.4	706.4	706.8	0.4

[1] Feet above mouth

[2] Floodway lies outside county limits

[3] Floodway width extend beyond county limits

* Cross section outside county limits, not shown on map.

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

MARTINEZ CREEK-WEST SALITRILLO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Calaveras Creek								
A	50	100	753	7.04	597.1	593.1[2]	594.1[2]	1.0
B	2,850	160	580	6.44	611.3	611.3	611.4	0.1
C	5,250	350	1,340	2.77	626.3	616.3	617.2	0.9

[1] Feet above U.S. Highway 87
[2] Elevation computed without consideration of flooding by Calaveras Creek Dam #3

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

FLOODWAY DATA

CALAVERAS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Indian Creek								
A	3,800[1]	180	2,060	5.9	561.4	561.4	562.3	0.9
B	5,700[1]	130	1,370	8.9	565.3	565.3	566.1	0.8
C	9,350[1]	310	2,910	4.2	575.6	575.6	576.6	1.0
D	15,750[1]	890	10,070	1.2	585.7	585.7	586.7	1.0
E	18,900[1]	310	1,940	6.2	594.9	594.9	595.8	0.9
F	21,750[1]	270	2,360	5.1	605.9	605.9	606.9	1.0
G	22,100[1]	500	4,830	2.5	608.9	608.9	609.8	0.9
H	26,300[1]	190	1,120	7.5	616.5	616.5	617.1	0.6
I	26,600[1]	400	2,800	3.0	620.6	620.6	621.5	0.9
J	27,020[1]	500	4,510	1.9	623.5	623.5	624.5	1.0
K	27,180[1]	600	4,620	1.8	624.3	624.3	625.1	0.8
L	28,300[1]	400	1,920	4.4	625.5	625.5	626.2	0.7
Medio Creek								
A	200[2]	2,276	15,634	1.7	703.3	703.3	704.3	1.0
B	8,290[2]	1,165	7,498	3.0	715.8	715.8	716.5	0.7
C	11,970[2]	804	2,701	8.4	726.4	726.4	727.0	0.6
D	17,800[2]	300	2,906	7.8	749.2	749.2	750.2	1.0
E	22,000[2]	326	3,224	7.0	764.2	764.2	765.2	1.0
F	25,400[2]	253	2,525	7.3	778.2	778.2	779.2	1.0
G	30,800[2]	426	3,414	5.4	796.9	796.9	797.9	1.0
H	33,200[2]	380	2,227	8.3	805.4	805.4	806.3	0.9
I	36,150[2]	347	2,969	6.2	820.2	820.2	821.2	1.0
J	42,150[2]	450	3,120	5.2	839.6	839.6	840.6	1.0
K	48,300[2]	204	1,876	8.6	859.3	859.3	860.2	0.9
L	53,100[2]	369	2,495	6.5	876.8	876.8	877.8	1.0

[1]Feet above mouth
[2]Feet above U. S. Highway 90

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

INDIAN CREEK-MEDIO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Caracol Creek								
A	1,100	103	973	8.1	772.3	772.3	773.3	1.0
B	6,550	188	1,097	7.2	799.1	799.1	800.1	1.0
Slick Ranch Creek								
A	15,930	200	1,274	5.8	762.5	762.5	762.5	0.0
B	17,330	180	1,245	5.9	764.6	764.6	764.8	0.2
C	19,370	280	1,573	4.7	783.6	783.6	784.1	0.5
D	21,620	260	1,323	5.6	790.8	790.8	791.7	0.9
E	23,620	115	741	7.5	799.5	799.5	800.3	0.8
F	26,420	215	1,120	5.0	812.8	812.8	813.8	1.0
Helotes Creek								
A	5,450	150	2,390	11.6	878.9	878.9	879.9	1.0
B	13,550	300	3,829	7.2	903.6	903.6	904.6	1.0
C	14,100	351	3,511	7.8	906.1	906.1	907.1	1.0
D	14,200	695	10,072	2.7	913.7	913.7	914.7	1.0
E	17,800	346	3,886	7.3	925.4	925.4	926.4	1.0
F	21,000	282	4,038	7.1	942.2	942.2	943.2	1.0
G	21,700	178	3,067	9.4	943.5	943.5	944.5	1.0
H	21,800	234	3,616	7.9	945.0	945.0	946.0	1.0
I	30,450	241	2,851	9.0	976.9	976.9	977.9	1.0
J	36,750	430	4,560	5.6	1,000.3	1,001.3	1,002.3	1.0
K	38,600	364	3,479	7.4	1,008.8	1,008.8	1,009.8	1.0
L	42,050	179	1,601	9.7	1,027.8	1,027.8	1,028.3	0.5
M	42,150	191	2,463	6.3	1,032.3	1,032.3	1,033.3	1.0
N	44,800	172	1,810	8.6	1,043.2	1,043.2	1,044.2	1.0

[1]Feet above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

CARACOL CREEK-SLICK RANCH CREEK-HELOTES CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Helotes Creek (continued)								
K	38,600	364	3,479	7.4	1,008.8	1,008.8	1,009.8	1.0
L	42,050	179	1,601	9.7	1,027.8	1,027.8	1,028.3	0.5
M	42,150	191	2,463	6.3	1,032.3	1,032.3	1,033.3	1.0
N	44,800	172	1,810	8.6	1,043.2	1,043.2	1,044.2	1.0

[1]Feet above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

HELOTES CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Helotes Creek								
O	46,100	142	1,628	9.5	1,048.8	1,048.8	1,049.8	1.0
P	50,950	128	1,544	10.0	1,071.0	1,071.0	1,072.0	1.0
Q	52,850	163	1,773	8.6	1,083.7	1,083.7	1,084.7	1.0
Los Reyes Creek								
A	3,000	134	1,051	9.3	1,041.4	1,041.4	1,042.4	1.0
B	9,400	98	734	9.2	1,092.0	1,092.0	1,093.0	1.0
C	9,600	168	1,520	4.5	1,096.0	1,096.0	1,097.0	1.0
D	13,850	117	940	7.0	1,128.1	1,128.1	1,129.1	1.0
E	13,950	115	945	6.9	1,134.0	1,134.0	1,135.0	1.0
F	16,250	227	1,312	5.2	1,149.1	1,149.1	1,150.1	1.0
G	16,350	155	933	7.2	1,151.8	1,151.8	1,152.8	1.0
H	17,900	147	925	6.9	1,164.0	1,164.0	1,165.0	1.0
I	18,000	133	814	8.3	1,165.7	1,165.7	1,166.2	0.5
J	24,350	121	498	6.8	1,236.9	1,236.9	1,237.9	1.0
Culebra Creek								
A	1,250	191	3,217	14.9	772.0	771.8[2]	772.6[2]	0.8
B	2,380	264	4,195	11.4	778.5	778.5	779.4	0.9
C	3,040	430	4,839	9.9	782.0	782.0	782.9	0.9
D	3,670	328	3,496	13.7	786.9	786.9	787.6	0.7
E	5,110	688	7,399	6.5	795.9	795.9	796.8	0.9
F	5,910	397	4,972	9.7	797.6	797.6	798.5	0.9
G	6,680	512/420[3]	7,739	6.2	800.3	800.3	801.3	1.0
H	7,370	522/422[3]	6,923	6.9	801.4	801.4	802.3	0.9
I	7,910	539/439[3]	6,366	7.5	802.6	802.6	803.5	0.9
J	9,260	572	3,468	13.8	806.8	806.8	807.5	0.7

[1]Feet above mouth.
[2]Elevations computed without consideration of backwater effects.
[3]Total width/width within county limits.

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

HELOTES CREEK-LOS REYES CREEK-CULEBRA CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Culebra Creek (cont.)								
K	10,220	826	6,361	7.6	811.6	811.6	812.6	1.0
L	11,250	635	10,649	4.5	815.4	815.4	816.2	0.8
M	12,630	296	3,903	12.3	816.5	816.5	817.3	0.8
N	13,210	335	5,289	9.1	819.2	819.2	820.0	0.8
O	14,340	359	5,106	9.4	822.2	822.2	823.0	0.8
P	15,470	326	4,638	10.4	825.6	825.6	826.4	0.8
Q	16,640	299	4,308	11.1	830.1	830.1	830.9	0.8
R	18,180	337	5,571	7.5	835.1	835.1	836.0	0.9
S	21,410	252	3,807	8.4	845.4	845.4	846.3	0.9
T	22,650	474	4,774	6.7	848.5	848.5	849.5	1.0
U	24,750	595	5,662	5.6	852.6	852.6	853.5	0.9
V	26,550	214	2,159	11.4	857.2	857.2	858.2	1.0
W	26,750	302	5,533	4.4	866.0	866.0	867.0	1.0
X	27,250	323	4,747	5.2	866.3	866.3	867.2	0.9
Y	28,300	380	5,019	4.9	867.2	867.2	868.2	1.0
Z	30,750	670	3,317	7.4	872.9	872.9	873.8	0.9
AA	33,020	374	3,287	7.4	883.9	883.9	884.9	1.0
AB	33,950	369	3,131	6.4	887.3	887.3	888.3	1.0
AC	35,950	149	1,984	10.1	893.6	893.6	894.4	0.8
AD	38,930	218	2,437	8.2	905.5	905.5	906.5	1.0
AE	42,360	326	2,784	7.2	919.8	919.8	920.7	0.9
AF	50,050	290	1,546	3.6	951.3	951.3	952.3	1.0

[1]Feet above mouth.

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

CULEBRA CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Rosillo Creek								
A	74,606	300[2]	1,637	6.7	667.4	667.4	668.4	1.0
B	75,082	300[2]	1,548	7.1	669.1	669.1	669.6	0.5
C	75,187	300[2]	1,439	7.6	669.3	669.3	669.8	0.5
D	76,887	300[2]	1,854	5.9	675.7	675.7	676.5	0.8
E	78,617	250[2]	1,588	6.9	683.6	683.6	683.6	0.0
F	80,987	250[2]	1,760	3.5	687.3	687.3	687.3	0.0
G	81,092	250[2]	1,637	3.7	687.4	687.4	687.4	0.0
H	81,672	250[2]	1,642	3.7	687.8	687.8	688.5	0.7
I	81,777	250[2]	1,551	3.9	690.8	690.8	690.8	0.0
J	82,877	250[2]	1,298	4.7	690.8	690.8	690.8	0.0
Tributary A of Culebra Creek								
A	1,300	130	654	8.1	793.3	793.3	794.3	1.0
B	2,600	185	602	8.8	799.5	799.5	799.5	0.0
C	4,040	222	828	6.4	806.0	806.0	806.0	0.0
D	4,680	135	570	7.7	808.2	808.2	808.9	0.7
E	6,400	142	529	8.3	817.3	817.3	817.4	0.1
F	7,305	104	397	11.1	822.2	822.2	822.5	0.3
G	8,265	200	769	4.9	827.0	827.0	827.5	0.5
H	9,795	192	572	6.6	836.1	836.1	836.1	0.0
I	10,200	190	851	4.5	841.8	841.8	842.3	0.5
J	10,710	53	479	7.9	844.1	844.1	844.1	0.0
K	11,130	44	276	13.8	845.8	845.8	845.8	0.0

[1]Feet above mouth
[2]Floodway width extends beyond county limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

FLOODWAY DATA

ROSILLO CREEK-TRIBUTARY A OF CULEBRA CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	[1] DISTANCE	[2] WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Cibolo Creek								
A	453,020	*/300	*	*	758.9	758.9	759.9	1.0
B	457,950	*/320	*	*	760.3	760.3	761.3	1.0
C	459,820	1131/981	31,236	3.4	788.1	788.1	788.3	0.2
D	462,040	561/181	12,155	8.7	789.9	789.9	790.2	0.3
E	464,040	452/132	9,585	11.0	794.2	794.2	794.4	0.2
F	466,480	820/350	12,032	8.6	799.3	799.3	799.8	0.5
G	468,050	1131/1026	14,615	7.1	803.7	803.7	803.9	0.2
H	470,150	718/628	10,547	9.8	809.2	809.2	809.7	0.5
I	472,200	584/479	10,154	10.2	817.2	817.2	817.4	0.2
J	474,150	477/247	11,302	9.1	822.8	822.8	823.4	0.6
K	476,060	363/123	8,681	11.9	827.2	827.2	827.8	0.6
L	479,030	265/215	5,857	17.5	834.6	834.6	835.0	0.4
M	481,010	457/367	11,010	9.1	843.4	843.4	844.4	1.0
N	483,920	380/280	8,790	11.4	850.0	850.0	850.6	0.6
O	485,990	421/291	11,163	8.9	855.4	855.4	856.2	0.8
P	488,030	288/198	7,279	13.7	859.3	859.3	859.8	0.5
Q	491,030	368/118	9,331	10.7	869.7	869.7	870.6	0.9
R	493,000	413/123	9,321	10.7	875.0	875.0	875.7	0.7
S	494,050	399/39	8,303	12.0	877.9	877.9	878.3	0.4
T	497,090	343/233	9,540	10.3	885.3	885.3	886.0	0.7
U	501,270	1068/548	15,484	6.1	893.0	893.0	893.8	0.8
V	504,350	484/154	10,278	9.2	898.9	898.9	899.6	0.7
W	507,400	658/228	11,289	8.4	904.2	904.2	904.9	0.7
X	510,380	573/123	9,153	10.3	909.7	909.7	910.3	0.6
Y	512,380	728/198	11,099	8.5	914.4	914.4	915.2	0.8
Z	514,550	535/315	9,684	9.7	918.3	918.3	919.1	0.8

[1] Feet above confluence with San Antonio River
[2] Width/width within county boundary
* Data not available

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

CIBOLO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Cibolo Creek (continued)								
AA	517,620	709/279	11,643	8.0	924.7	924.7	925.5	0.8
AB	520,770	410/260	9,688	9.6	930.1	930.1	930.8	0.7
AC	524,280	368/198	9,404	9.9	937.8	937.8	938.4	0.6
AD	527,430	574/64	14,316	6.5	943.4	943.4	944.2	0.8
AE	531,680	339/159	8,018	11.5	947.7	947.7	948.7	1.0
AF	534,650	759/459	14,306	6.4	954.0	954.0	954.9	0.9
AG	537,950	856/666	15,098	6.1	960.0	960.0	961.0	1.0
AH	540,950	474/114	9,851	9.2	965.0	965.0	965.6	0.6
AI	544,350	1347/367	14,488	6.1	974.3	974.3	974.7	0.4
AJ	546,340	1967/97	16,365	5.4	979.7	979.7	980.1	0.4
AK	551,630	916/746	11,509	7.7	986.1	986.1	986.7	0.6
AL	554,690	410/150	8,949	8.6	992.6	992.6	993.3	0.7
AM	558,020	579/179	11,513	6.7	997.6	997.6	998.4	0.8
AN	561,830	398/208	8,298	9.3	1,005.0	1,005.0	1,005.4	0.4
AO	564,850	340/120	6,701	11.4	1,008.7	1,008.7	1,009.3	0.6
AP	567,990	1625/1215	16,252	4.7	1,016.5	1,016.5	1,017.2	0.7
AQ	570,960	1489/1449	15,219	4.9	1,020.2	1,020.2	1,020.9	0.7
AR	575,040	2523/2333	19,349	3.9	1,028.6	1,028.6	1,029.2	0.6
AS	577,100	1406/586	13,910	5.4	1,032.5	1,032.5	1,033.0	0.5
AT	580,280	825/525	10,493	7.0	1,038.7	1,038.7	1,039.3	0.6
AU	584,170	435/15	7,091	10.3	1,045.1	1,045.1	1,045.7	0.6
AV	588,200	815/125	10,562	6.9	1,055.1	1,055.1	1,055.9	0.8
AW	591,520	1320/650	19,121	3.7	1,065.2	1,065.2	1,065.7	0.5
AX	594,430	899/499	12,501	5.7	1,069.6	1,069.6	1,070.2	0.6
AY	597,200	1535/305	15,717	4.5	1,073.8	1,073.8	1,074.5	0.7

[1]Feet above confluence with San Antonio River
[2]Width/width within county boundary

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

CIBOLO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Cibolo Creek (continued)								
AZ	601,000	3263/63	13,869	4.6	1,082.3	1,082.3	1,082.3	0.0
BA	603,330	4405/305	17,421	3.7	1,086.3	1,086.3	1,086.3	0.0
BB	607,600	1368/768	12,806	5.0	1,096.4	1,096.4	1,097.1	0.7
BC	611,570	500/370	7,751	8.3	1,099.8	1,099.8	1,100.4	0.6
BD	616,650	553/263	7,152	8.1	1,109.5	1,109.5	1,110.3	0.8
BE	618,560	512/242	6,540	8.8	1,113.1	1,113.1	1,113.7	0.6
BF	620,530	604/194	7,137	8.1	1,120.8	1,120.8	1,121.4	0.6
BG	622,540	727/267	10,855	4.8	1,127.1	1,127.1	1,127.6	0.5
BH	676,300	286/146	4,110	8.5	1,234.3	1,234.3	1,234.9	0.6
BI	679,360	254/154	4,315	8.1	1,242.1	1,242.1	1,242.9	0.8
BJ	681,340	405/305	5,676	6.2	1,249.8	1,249.8	1,250.7	0.9
BK	682,810	295/215	4,847	7.2	1,254.2	1,254.2	1,254.9	0.7
BL	685,760	215/140	4,006	7.3	1,260.7	1,260.7	1,261.5	0.8
BM	687,530	230/60	3,377	8.5	1,264.9	1,264.9	1,265.6	0.7
BN	689,830	320/75	5,072	5.7	1,270.3	1,270.3	1,271.0	0.7

[1]Feet above confluence with San Antonio River
[2]Width/width within county boundary

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

CIBOLO CREEK

Flooding information for Huesta Creek, Salado Creek, French Creek, Leon Creek, Huebner Creek, Mud Creek, and the San Antonio River was obtained from the Flood Insurance Study for the City of San Antonio (Reference 57). The officials of the City of San Antonio requested a zero surcharge on all streams within the city; therefore, no floodways were computed for these streams.

In this revision, floodway computations for Slick Ranch Creek (1.), Medio Creek (11.), and Cibolo Creek (12.) were revised as a result of new hydraulic data. No floodway information was available for Balcones Creek.

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were computed at cross sections. Between cross sections, the boundaries were interpolated. In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

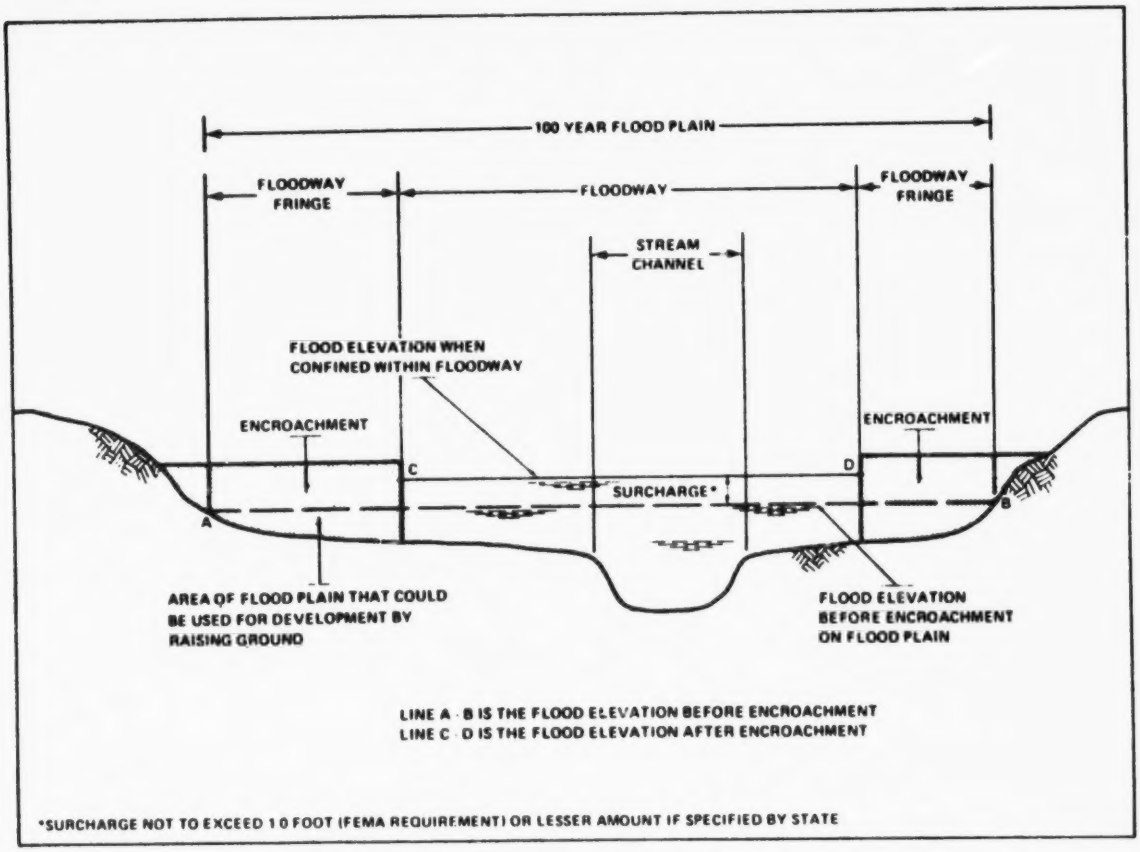
Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, "Without Floodway" elevations presented in Table 2 for certain downstream cross sections of West Fork Olmos Creek, Calaveras Creek, and Culebra Creek are lower than the regulatory flood elevations in that area, which must take into account the 100-year flooding due to backwater from other sources.

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail in the City of North Little Rock.

5.1 Reach Determinations

Reaches are defined as sections of floodplain that have relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference may not have a variation greater than that indicated in the following tabulation for more than 20 percent of the reach:


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FLOODWAY SCHEMATIC - Figure 2

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of the Bexar County are shown on the Flood Profiles (Exhibit 1) and summarized in Table 3.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION (FEET NGVD)[3]
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
West Fork Olmos Creek							
Reach 1	0180, 0190	-0.8	-0.3	+0.5	010	A2	Varies
Olmos Creek							
Reach 1	0180, 0185, 0195	-1.4	-0.4	+0.8	015	A3	Varies
Reach 2	0180	-0.4	-0.1	+0.3	005	A1	Varies
Martinez Creek							
Reach 1	0380, 0390, 0395	-3.2	-1.1	+2.4	030	A6	Varies
Reach 2	0380	-0.8	-0.4	+0.6	010	A2	Varies
West Salitrillo Creek							
Reach 1	0240, 0245	-1.5	-0.6	+1.6	015	A3	Varies
Reach 2	0240	-0.7	-0.2	+1.4	005	A1	Varies

[1]Flood Insurance Rate Map Panel [2]Weighted Average [3]Rounded to Nearest Foot

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

WEST FORK OLMOS CREEK-OLMOS CREEK-MARTINEZ CREEK-WEST SALITRILLO CREEK

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Slick Ranch Creek							
Reach 1	310,320	-2.5	-0.7	+1.6	050	A10	Varies
Reach 2	310	-2.1	-0.8	+1.6	020	A5	Varies
Helotes Creek							
Reach 1	165,170, 305	-4.4	-1.3	+2.2	045	A9	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

SLICK RANCH CREEK-HELOTES CREEK

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Calaveras Creek							
Reach 1	0390	-7.2	-0.8	+0.7	070	A14	Varies
Reach 2	0390	-1.8	-0.5	+1.5	020	A4	Varies
Indian Creek							
Reach 1	0480, 0490	-2.8	-0.9	+2.3	030	A6	Varies
Reach 2	0480	-3.7	-1.1	+2.3	035	A7	Varies
Medio Creek							
Reach 1	0285, 0305, 0315, 0320	-4.3	-1.3	+3.0	045	A9	Varies
Caracol Creek							
Reach 1	0315	-4.1	-1.1	+1.7	040	A8	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORTED AREAS)

FLOOD INSURANCE ZONE DATA

CALAVERAS CREEK - INDIAN CREEK - MEDIO CREEK - CARACOL CREEK

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION (FEET NGVD)[3]
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
Helotes Creek (cont.)							
Reach 2	0155, 0160, 0165, 0170	-3.1	-0.8	+1.8	030	A6	Varies
Reach 3	0050, 0160	-1.9	-0.6	+1.1	020	A4	Varies
Los Reyes Creek							
Reach 1	0155	-2.0	-0.6	+1.1	020	A4	Varies
Culebra Creek							
Reach 1	0305, 0310	-8.3	-2.7	+5.1	085	A17	Varies
Reach 2	0165. 0305	-3.9	-1.1	+3.1	040	A8	Varies
Reach 3	0165	-6.2	-1.9	+3.9	060	A12	Varies
Reach 4	0150, 0165	-3.0	-1.1	+3.1	030	A6	Varies
Rosillo Creek							
Reach 1	0375, 0380	-2.2	-0.6	+1.7	020	A4	Varies
Huesta Creek							
Reach 1	0160	-3.2	-0.9	+1.8	030	A6	Varies

[1]Flood Insurance Rate Map Panel [2]Weighted Average [3]Rounded to Nearest Foot

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

HELOTES CREEK-LOS REYES CREEK-CULEBRA CREEK-ROSILLO CREEK-HUESTA CREEK

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Salado Creek							
Reach 1	185,195						
	225	-3.7	-0.9	+8.8	035	A7	Varies
Reach 2	185	-3.9	-1.2	+3.9	040	A8	Varies
French Creek							
Reach 1	170	-2.3	-0.4	+1.6	025	A5	Varies
Leon Creek							
Reach 1	310,480						
	490	-10.2	-3.2	+7.5	100	A20	Varies
Reach 2	170,310	-7.0	-2.4	+5.1	070	A14	Varies
Huebner Creek							
Reach 1	310,350	-4.4	-1.6	+4.1	045	A9	Varies
Mud Creek							
Reach 1	225	-4.7	-1.6	+3.6	045	A9	Varies
San Antonio River							
Reach 1	525	-8.0	-3.0	+5.7	080	A16	Varies
Shallow Flooding							
Area 1	550	*	*	*	*	AO	2'Depth

*Not computed for shallow flooding

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

SALADO CREEK-FRENCH CREEK-LEON CREEK-HUEBNER CREEK-MUD CREEK-SAN ANTONIO RIVER-SHALLOW FLOODING AREA 1

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION (FEET NGVD)[3]
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
Shallow Flooding Area 3	0550	*	*	*	*	AO	3' Depth
Shallow Flooding Area 4	0550	*	*	*	*	AH	503
Tributary A of Culebra Creek Reach 1	0310	-1.4	-0.5	+0.7	015	A3	Varies

[1]Flood Insurance Rate Map Panel [2]Weighted Average [3]Rounded to Nearest Foot

*Not computed for shallow flooding.

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

SHALLOW FLOODING AREA 3-SHALLOW FLOODING AREA 4-TRIBUTARY A OF CULEBRA CREEK

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Cibolo Creek							
Reach 1	245,250, 275	-8.5	-2.5	+4.6	085	A17	Varies
Reach 2	75,100, 125,250	-12.3	-3.8	+6.1	120	A22	Varies
Reach 3	50,75	-12.3	-3.8	+6.1	120	A22	Varies
Balcones Creek							
Reach 1	50	-5.0	*	*	050	A10	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

*Data not computed

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

CIBOLO CREEK-BALCONES CREEK

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations rounded to the nearest one- half foot, multiplied by 10, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF, and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.
Zone AO:	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; depths are shown but no FHFs are determined.
Zone AH:	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; base flood elevations are shown, but no FHFs are determined.
Zones A3, A4, A5, A6, A7, A8, A9, A10, A12, A14, A16, A17, A20, and A22:	Special Flood Hazard Areas inundated by the 100-year flood; with base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- or 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding; not subdivided.

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the community are shown in Table 3.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the unincorporated areas of Bexar County is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevations. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

6.0 OTHER STUDIES

Olmos Creek is included in a COE Flood Plain Information report (Reference 6). The flood profiles in this study agree within 0.5 foot at all cross sections.

As part of the work plan for Martinez Creek, the SCS prepared a profile that is 2 to 3 feet lower than the one in this study (References 10 and 22). Since 1958 when Martinez Creek was prepared, a number of peak flood flows have been studied especially for the smaller drainage areas that justify a higher runoff factor than the SCS used. As the COE and USGS are in agreement, especially with the 100-year flood discharges, the profiles in this study supersede those in the earlier report for the studied reaches of Martinez Creek.

Flood Insurance Studies have been prepared for Shavano Park, Terrell Hills, Converse, Alamo Heights, Grey Forest, Hollywood Park, Selma, and Kirby. Due to the scope of this revision, those studies were not rechecked for agreement with this study. Based on the results of the previously effective study, this study is assumed to be in agreement with those studies.

Due to its more up-to-date information, this study supersedes the previous Flood Insurance Study for the unincorporated areas of Bexar County (Reference 56).

7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Federal Regional Center, 800 North Loop 288, Denton, Texas 76201-3698.

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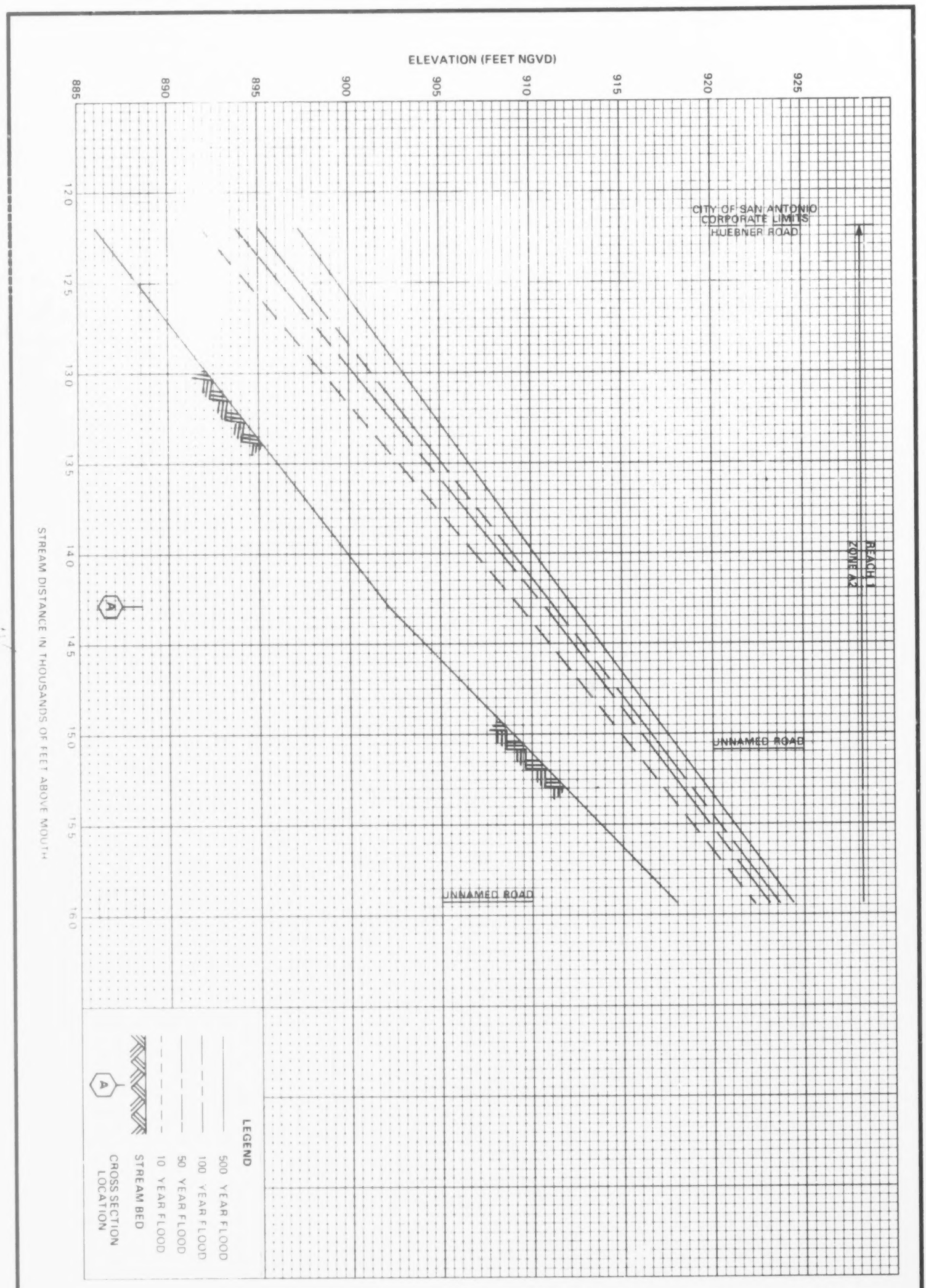

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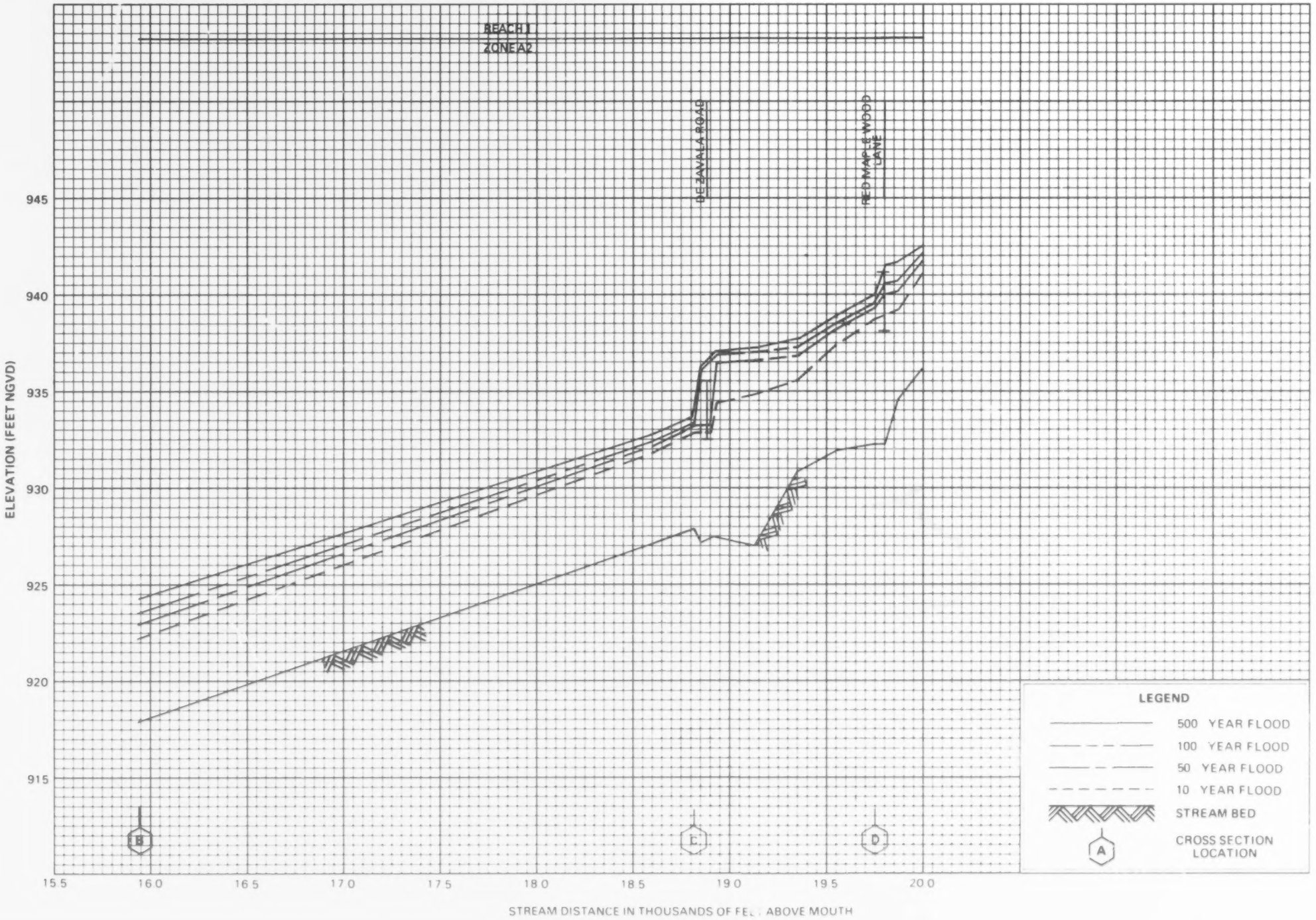


FLOOD PROFILES

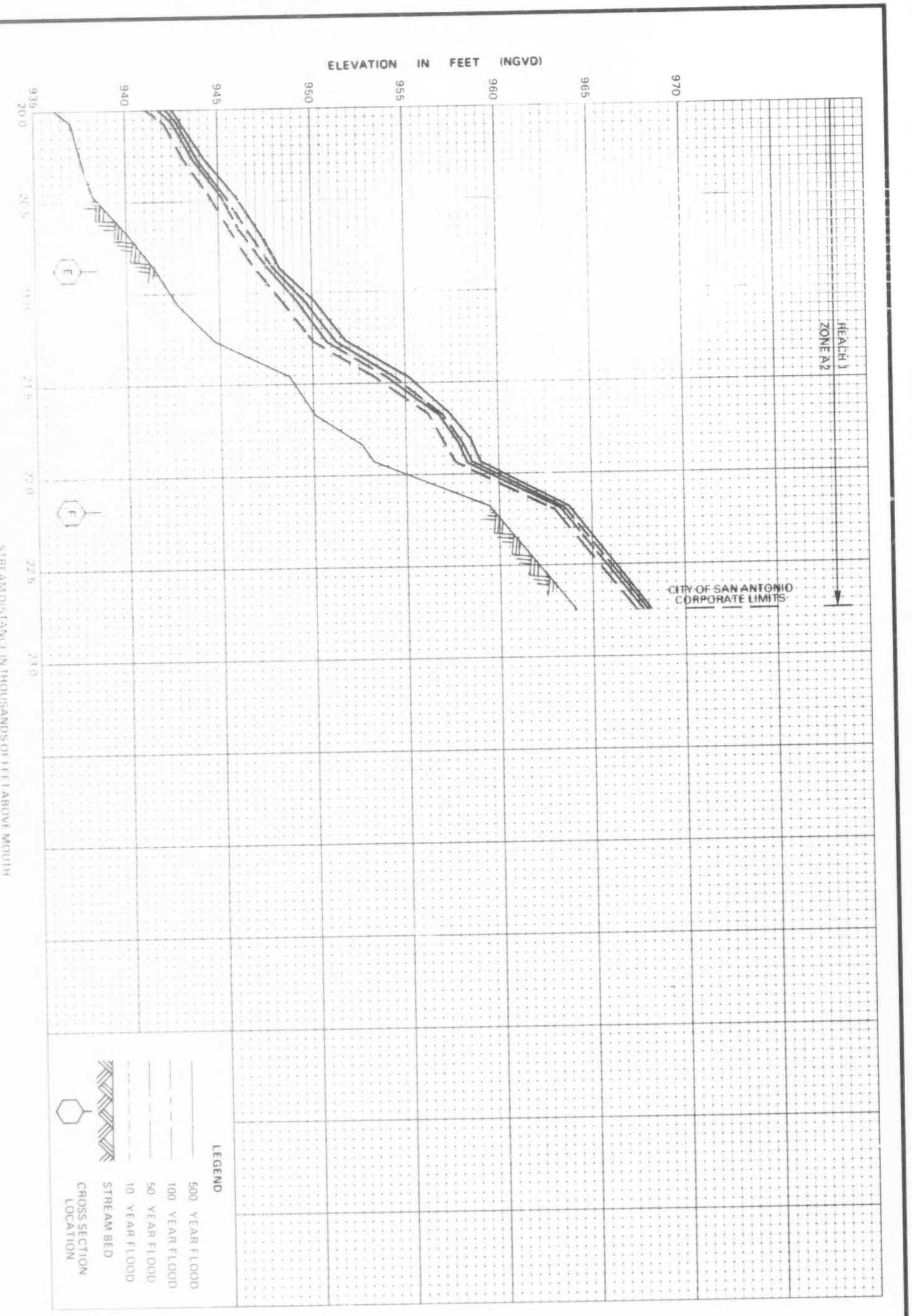
WEST FORK OLMOS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

02P



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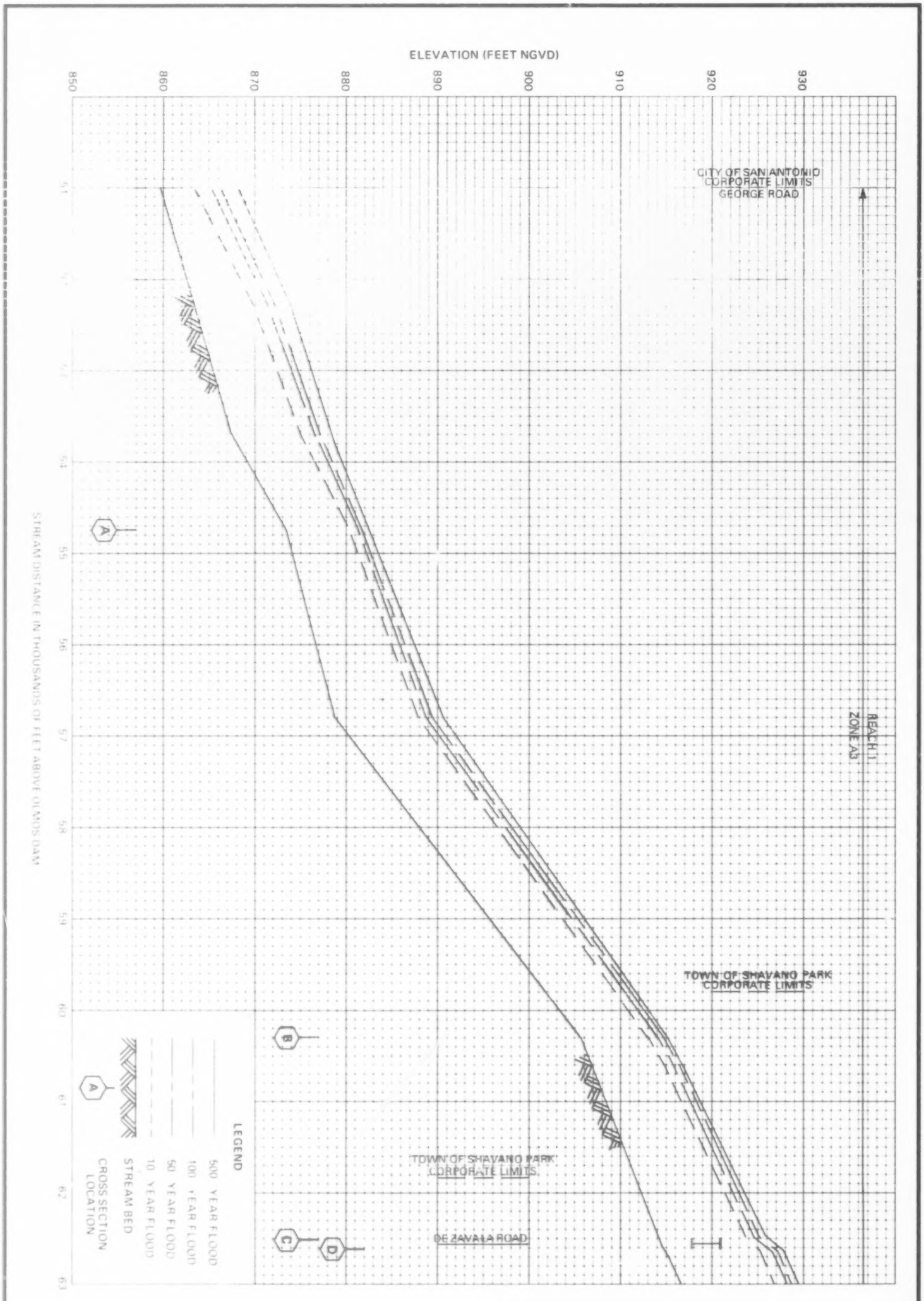

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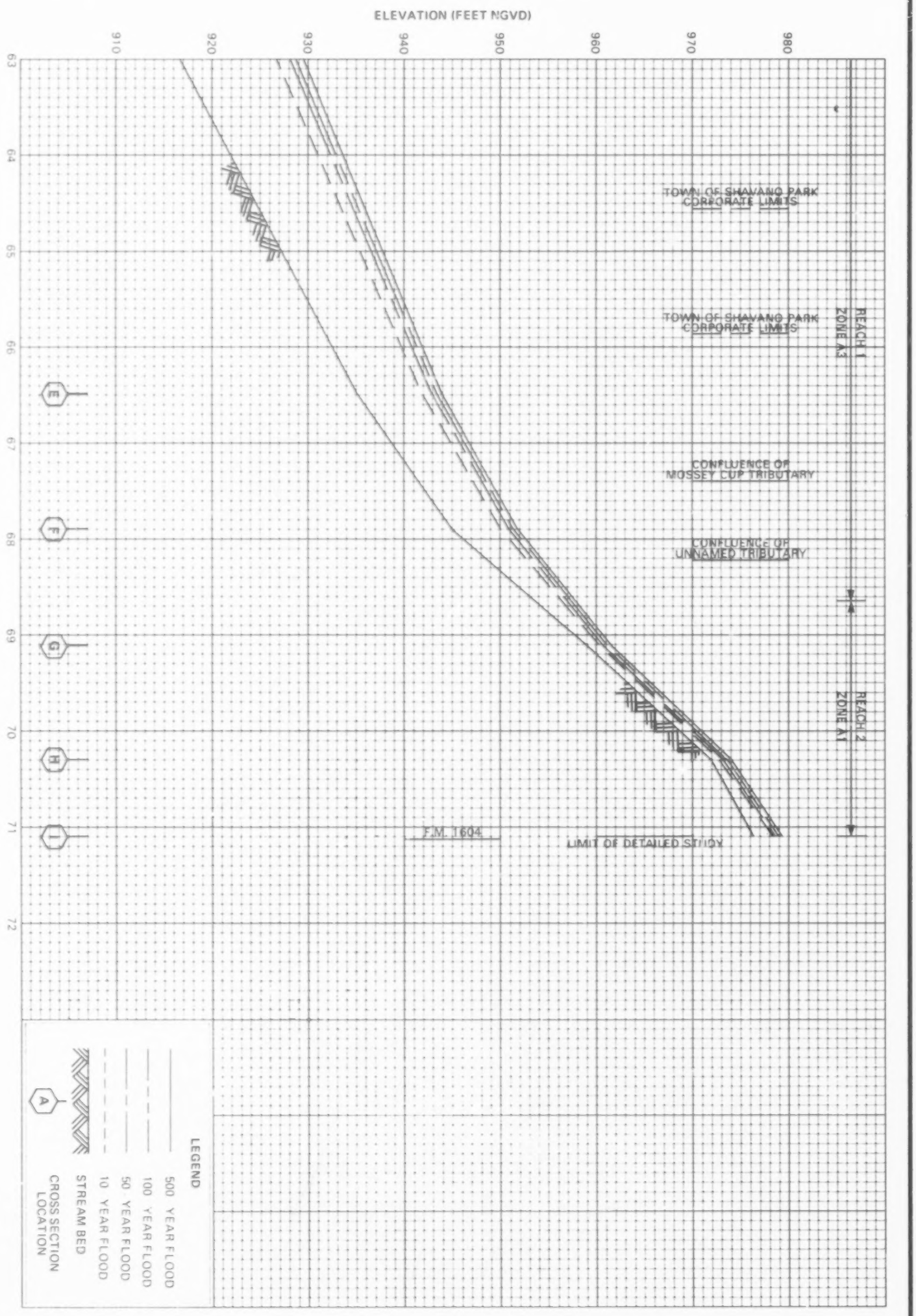

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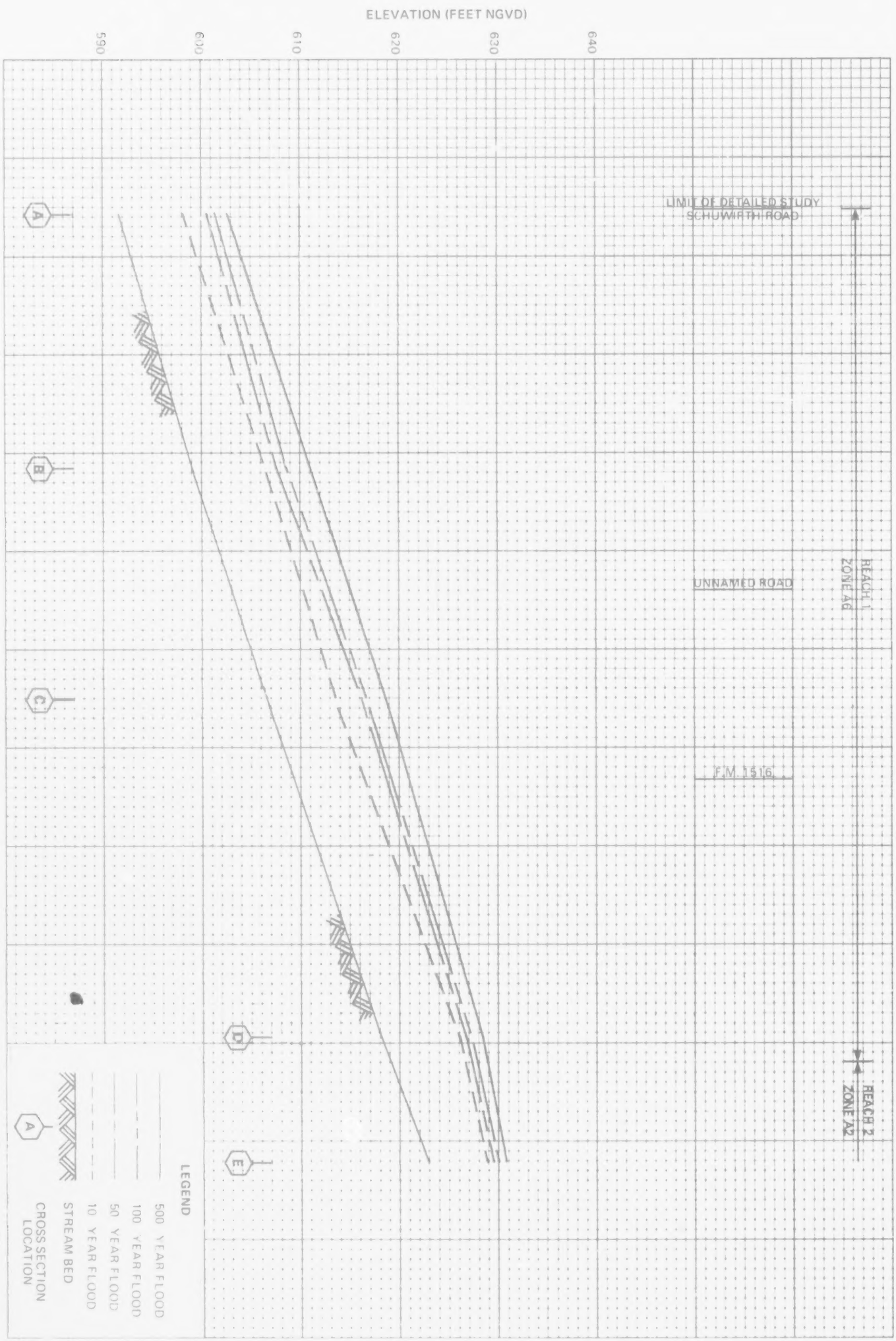

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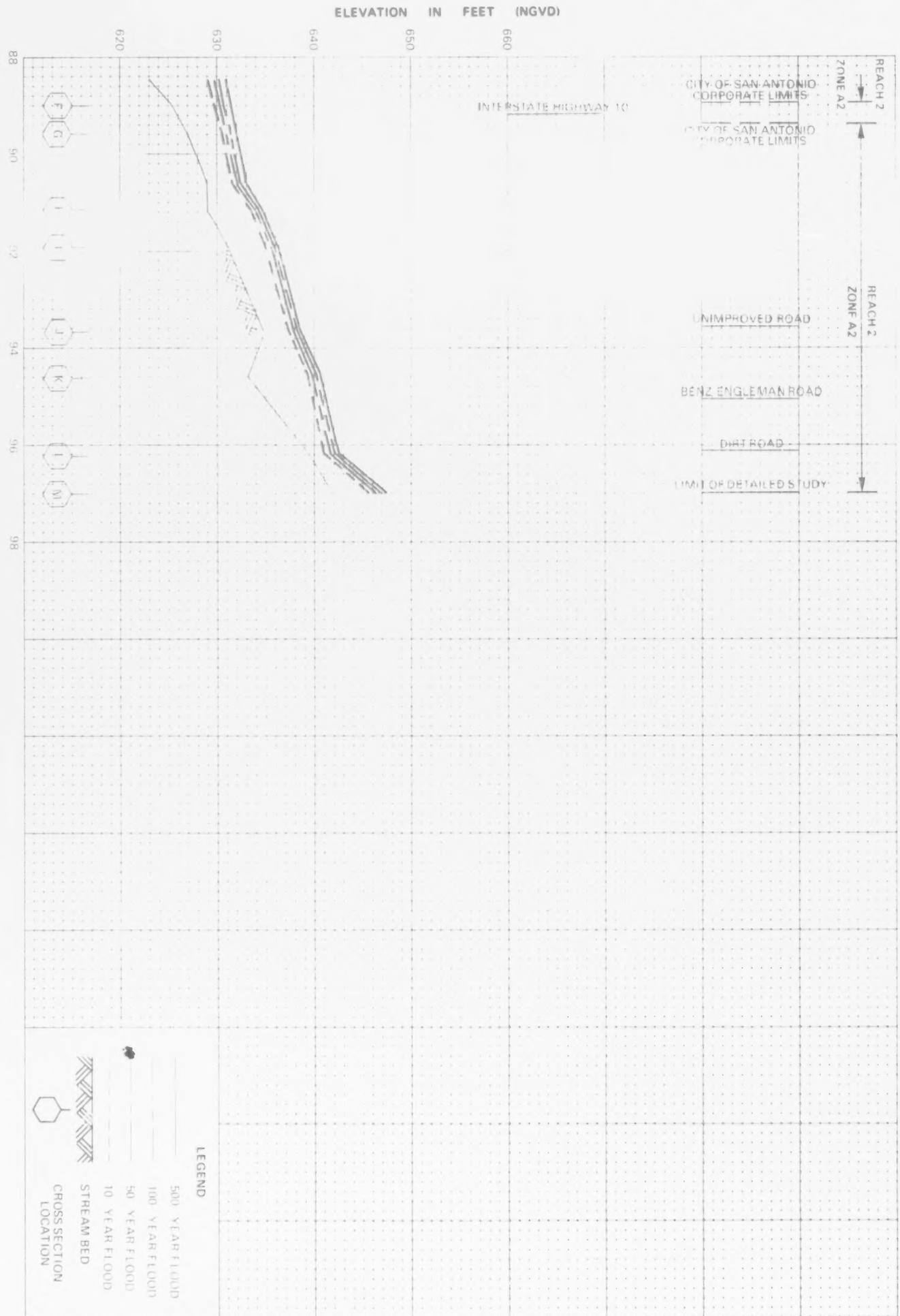

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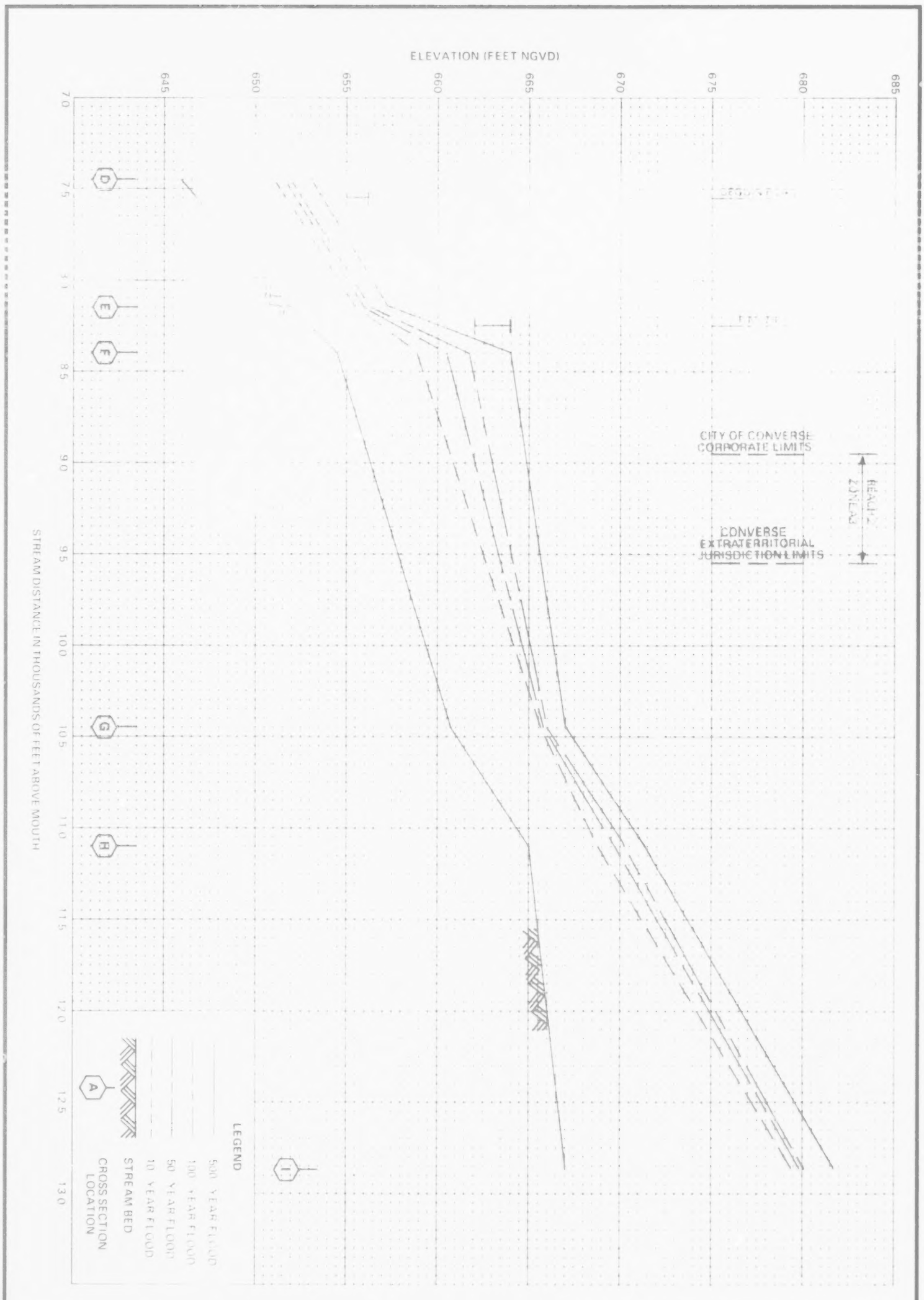
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD PROFILES

MARTINEZ CREEK



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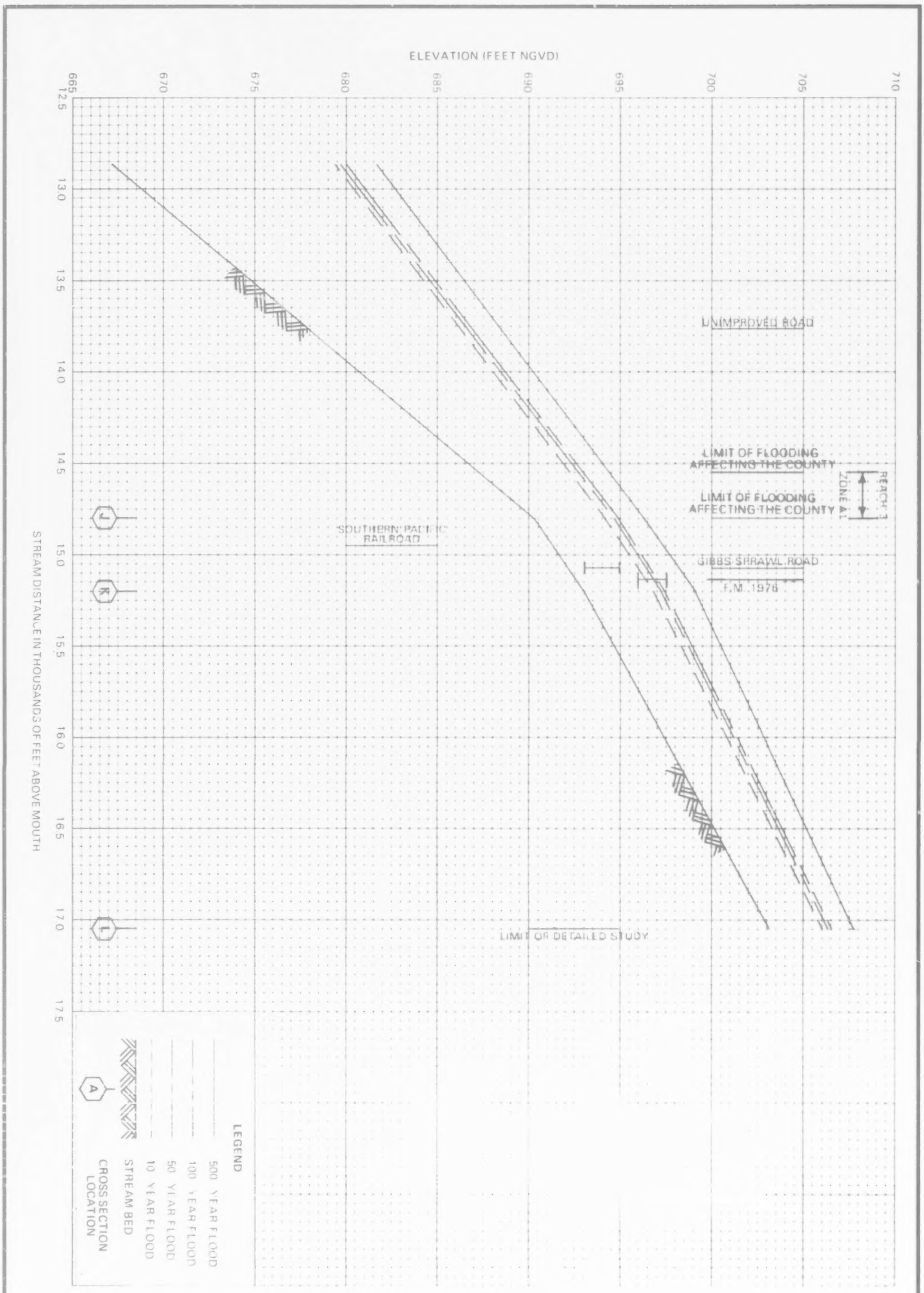

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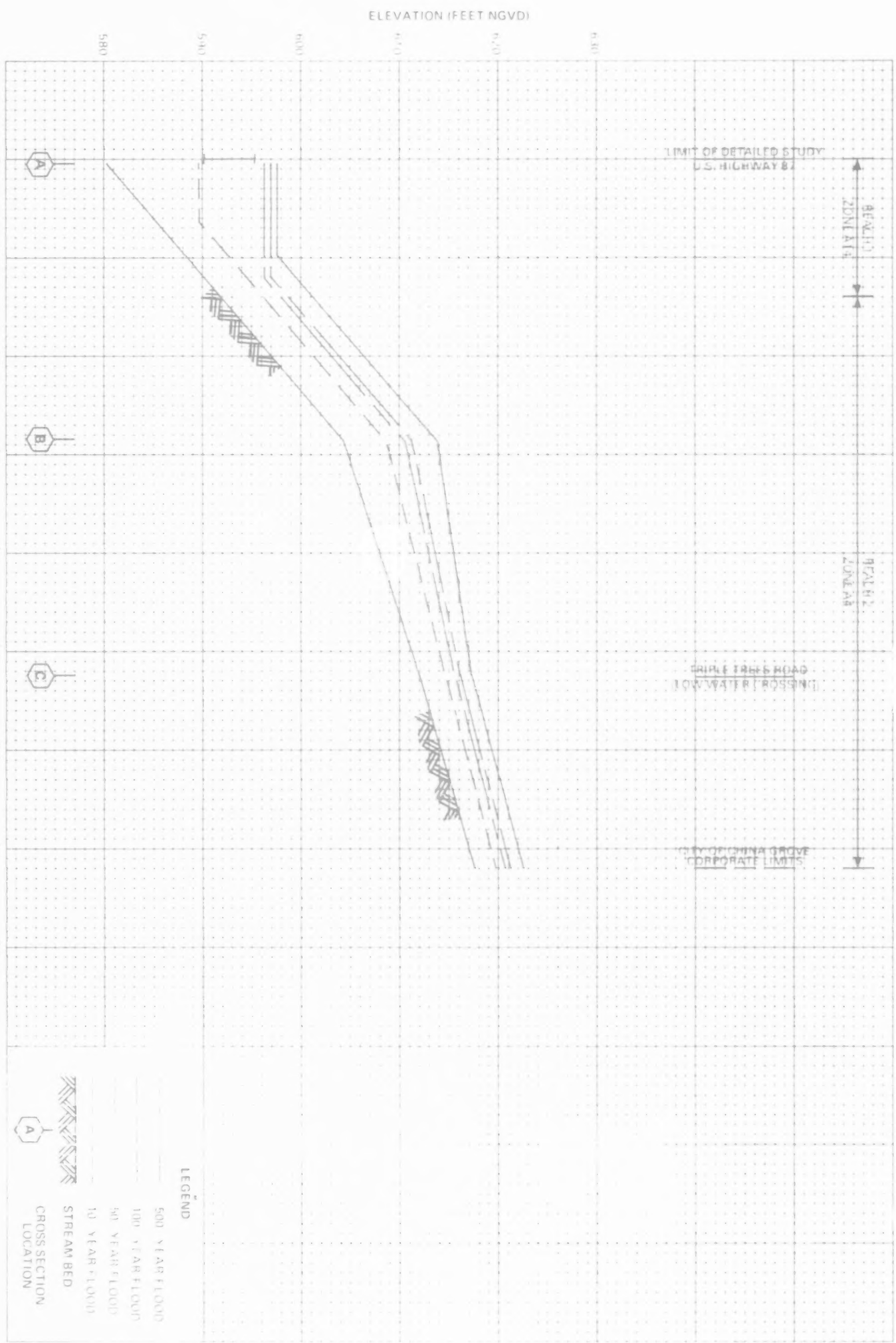
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

FLOOD PROFILES

WEST SALITRILLO CREEK



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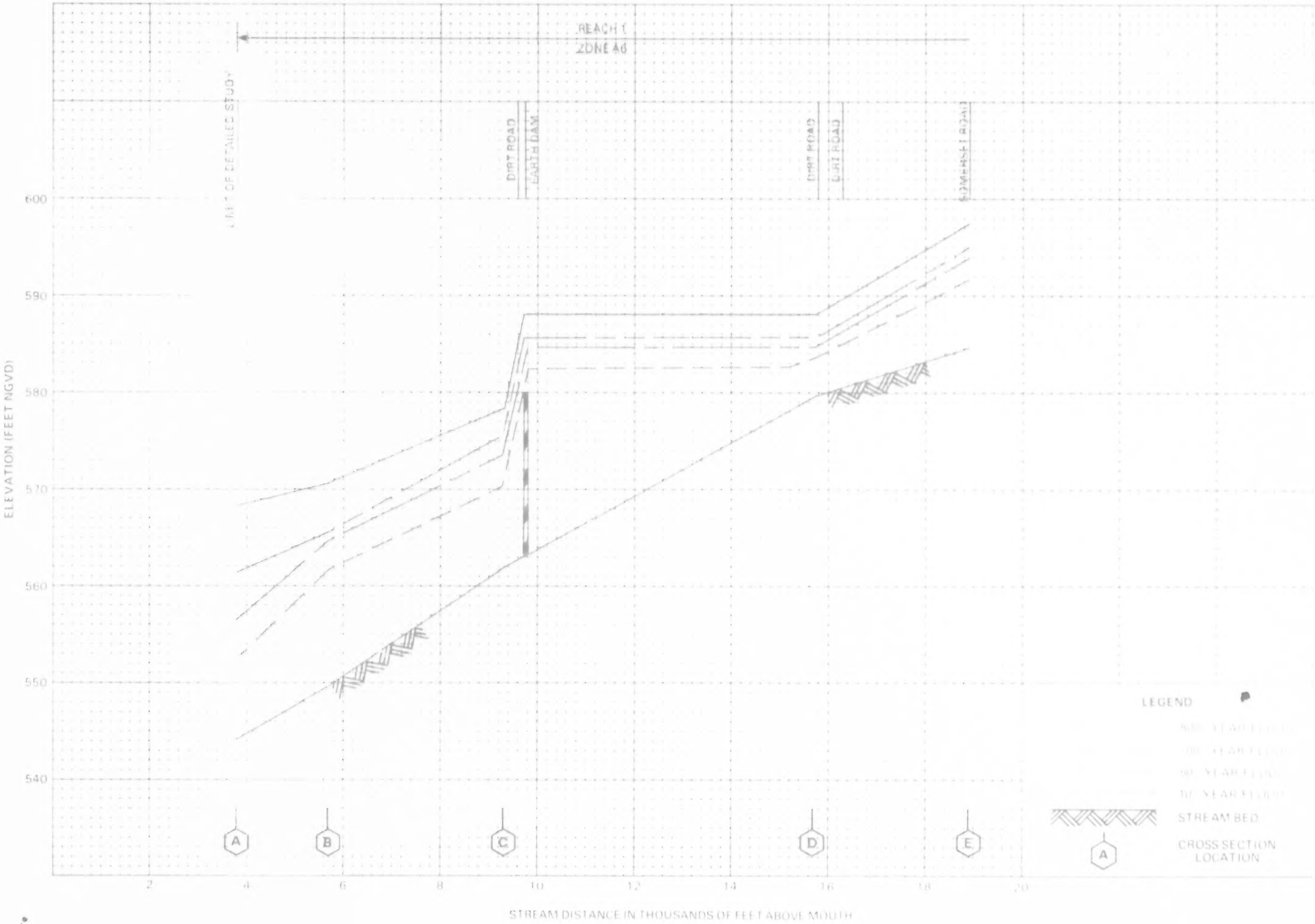
10P	FEDERAL EMERGENCY MANAGEMENT AGENCY BEXAR COUNTY, TX (UNINCORPORATED AREAS)	FLOOD PROFILES CALAVERAS CREEK



FLOOD PROFILES

INDIAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

11P

FLOOD PROFILES

INDIAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

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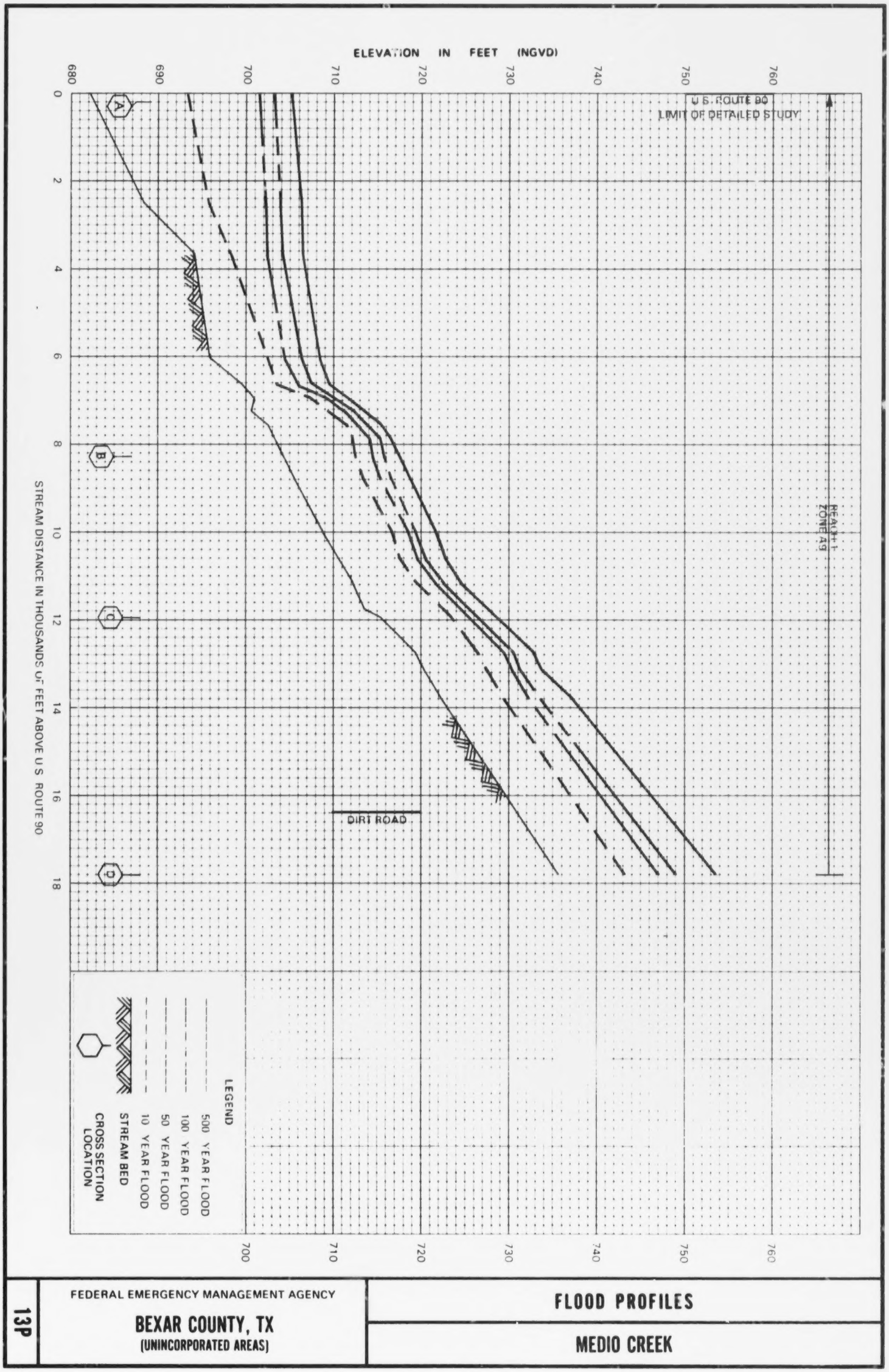

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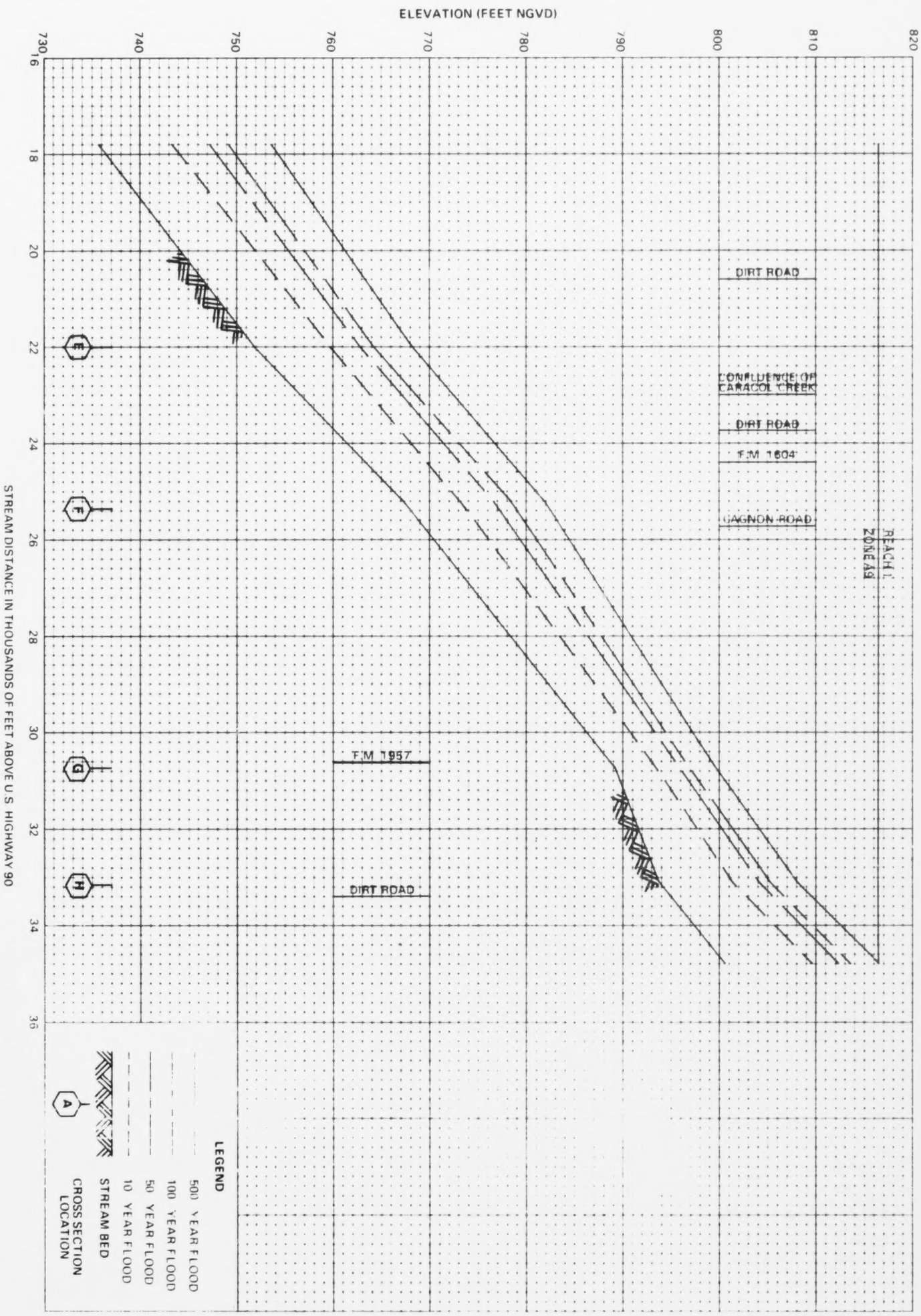

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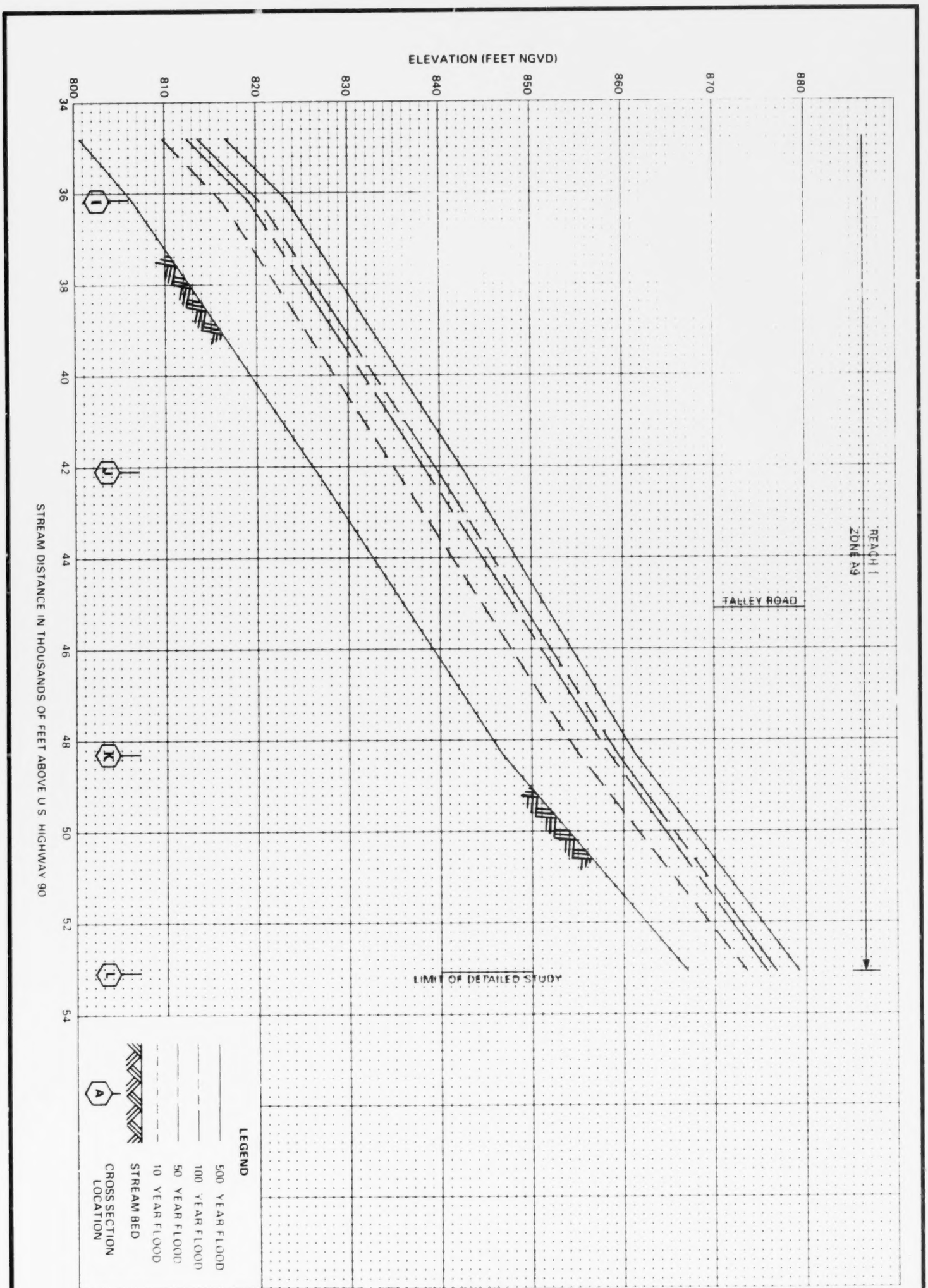
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

FLOOD PROFILES

MEDIO CREEK



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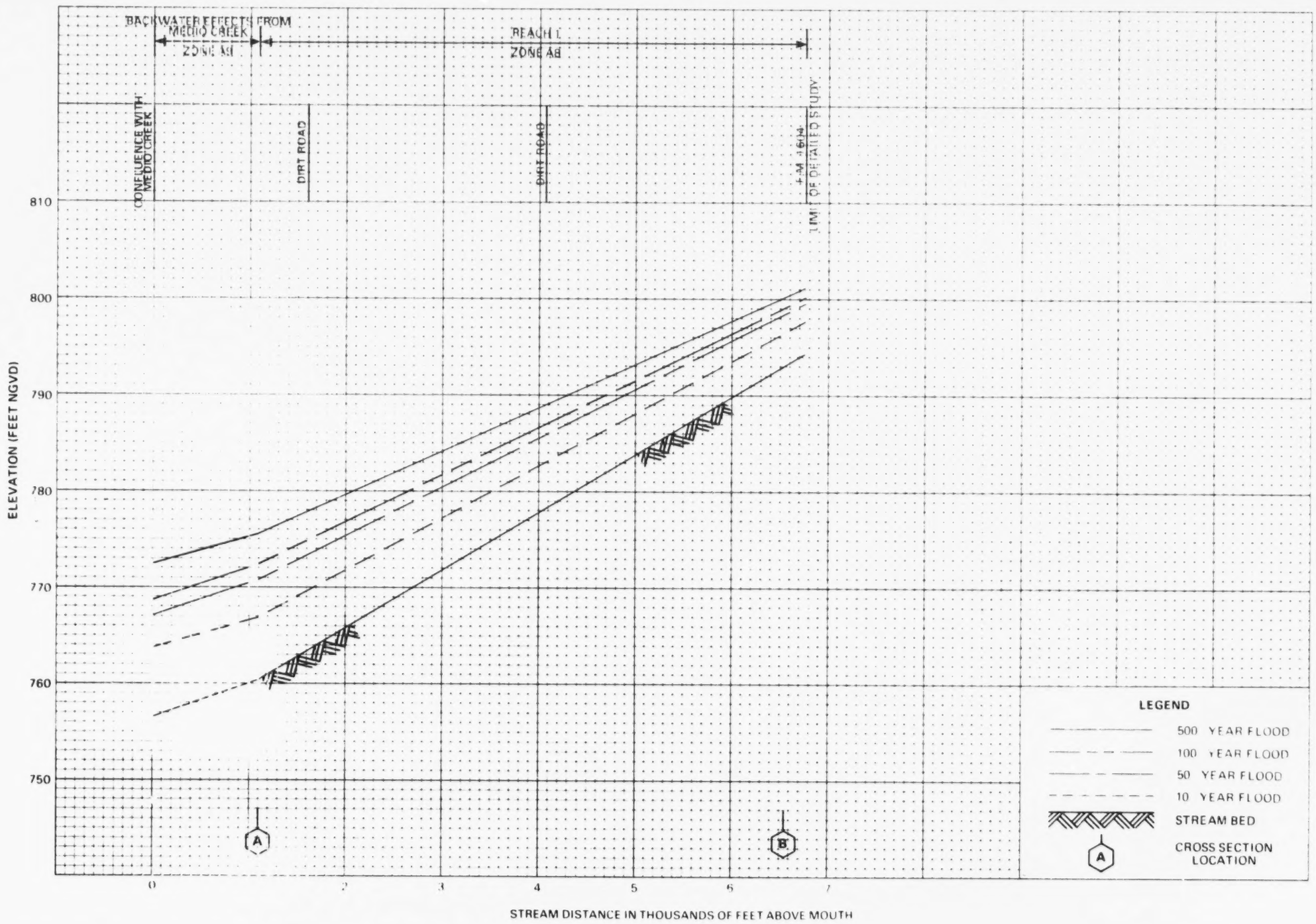
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

FLOOD PROFILES

MEDIO CREEK



FLOOD PROFILES

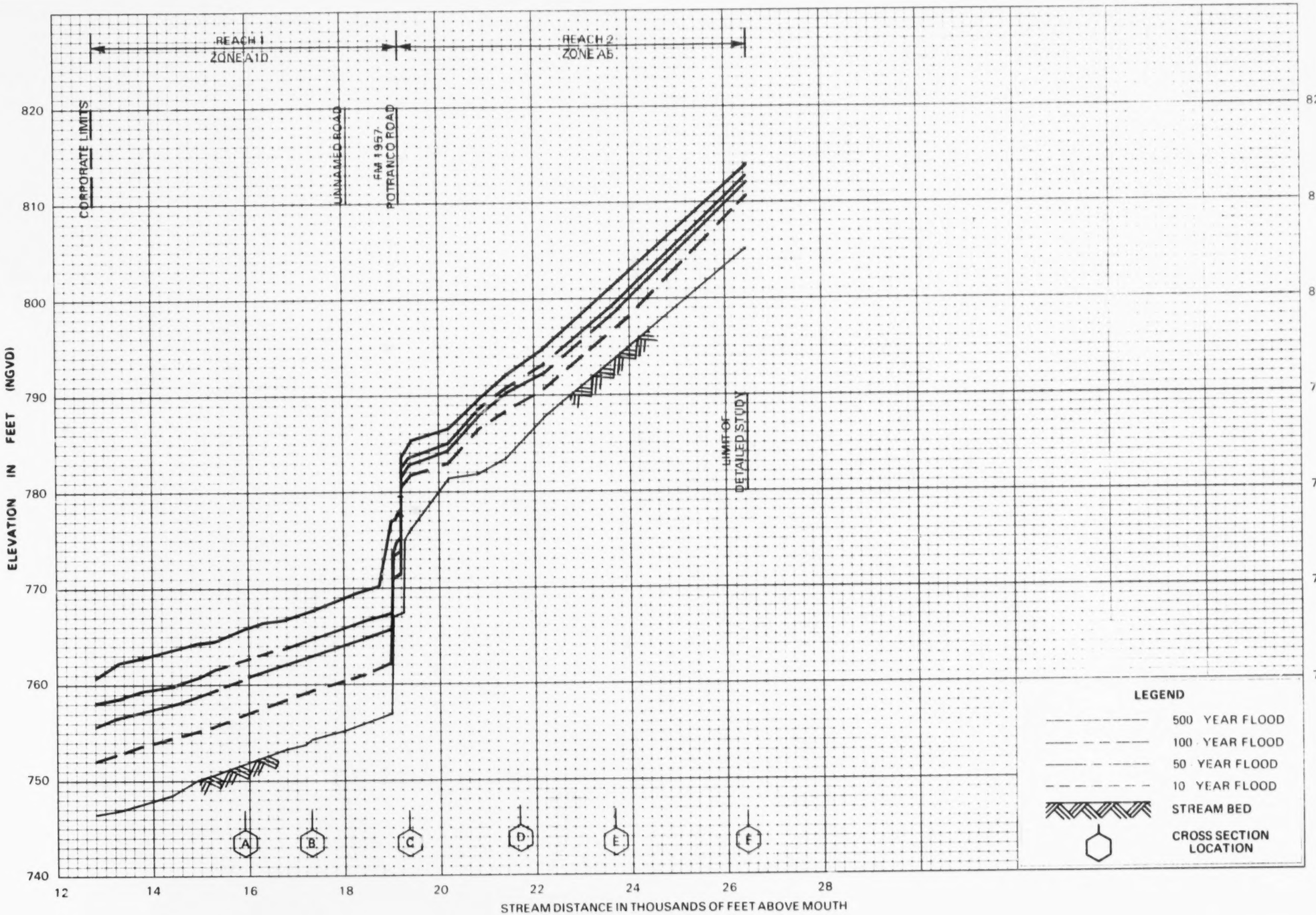
CARACOL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

16P



FLOOD PROFILES

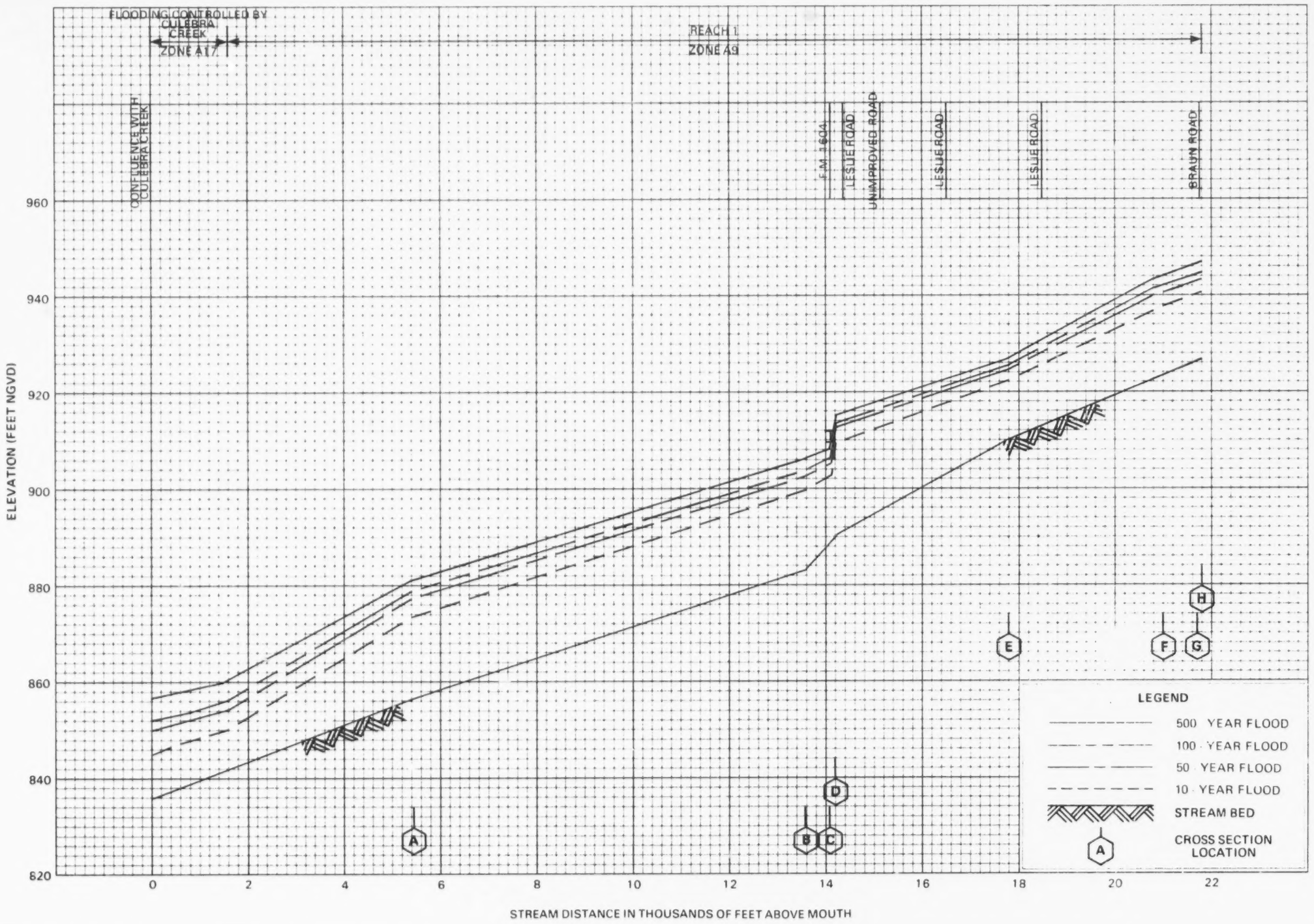
SLICK RANCH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

17P

64



FLOOD PROFILES

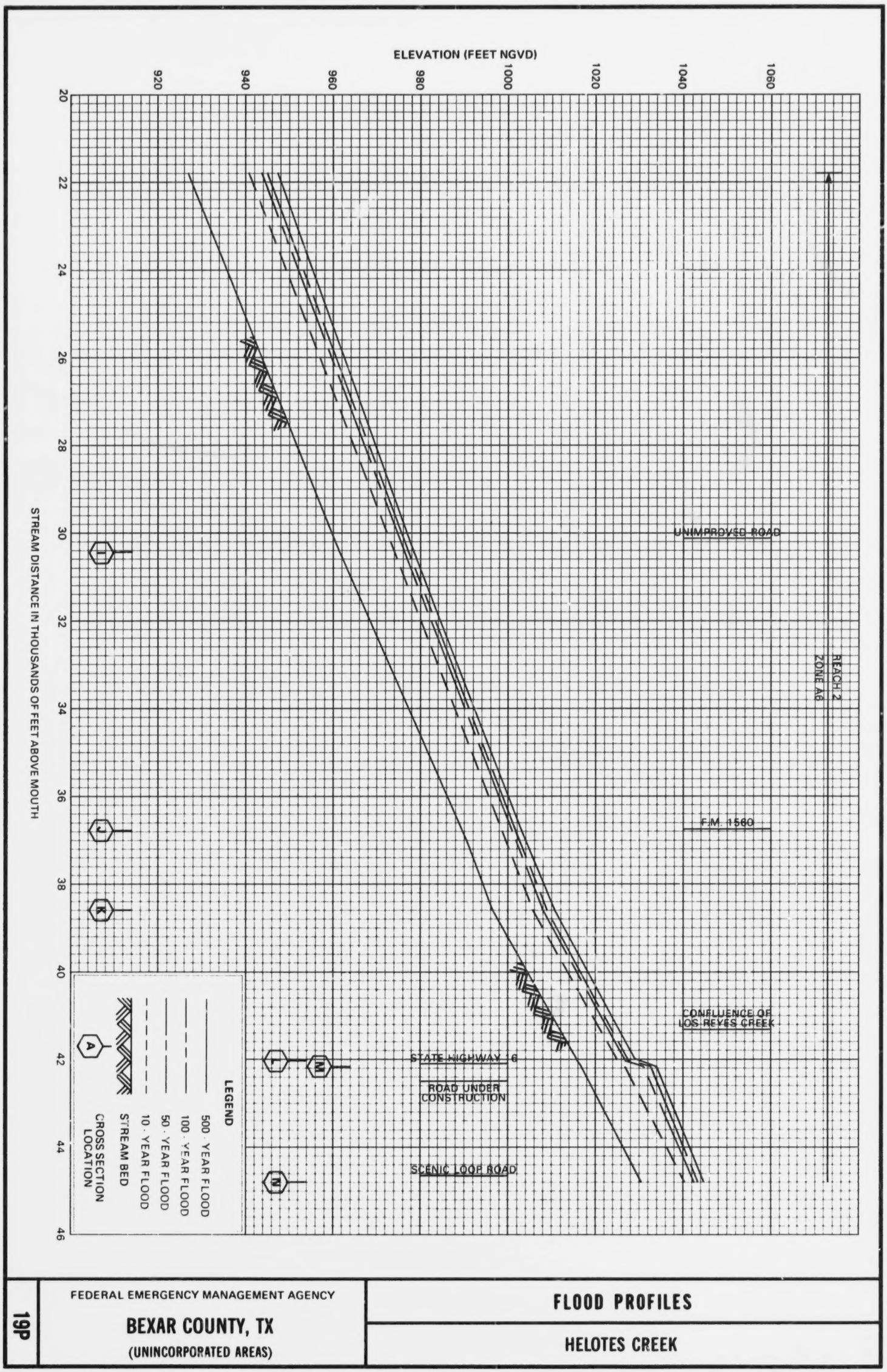
HELOTES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

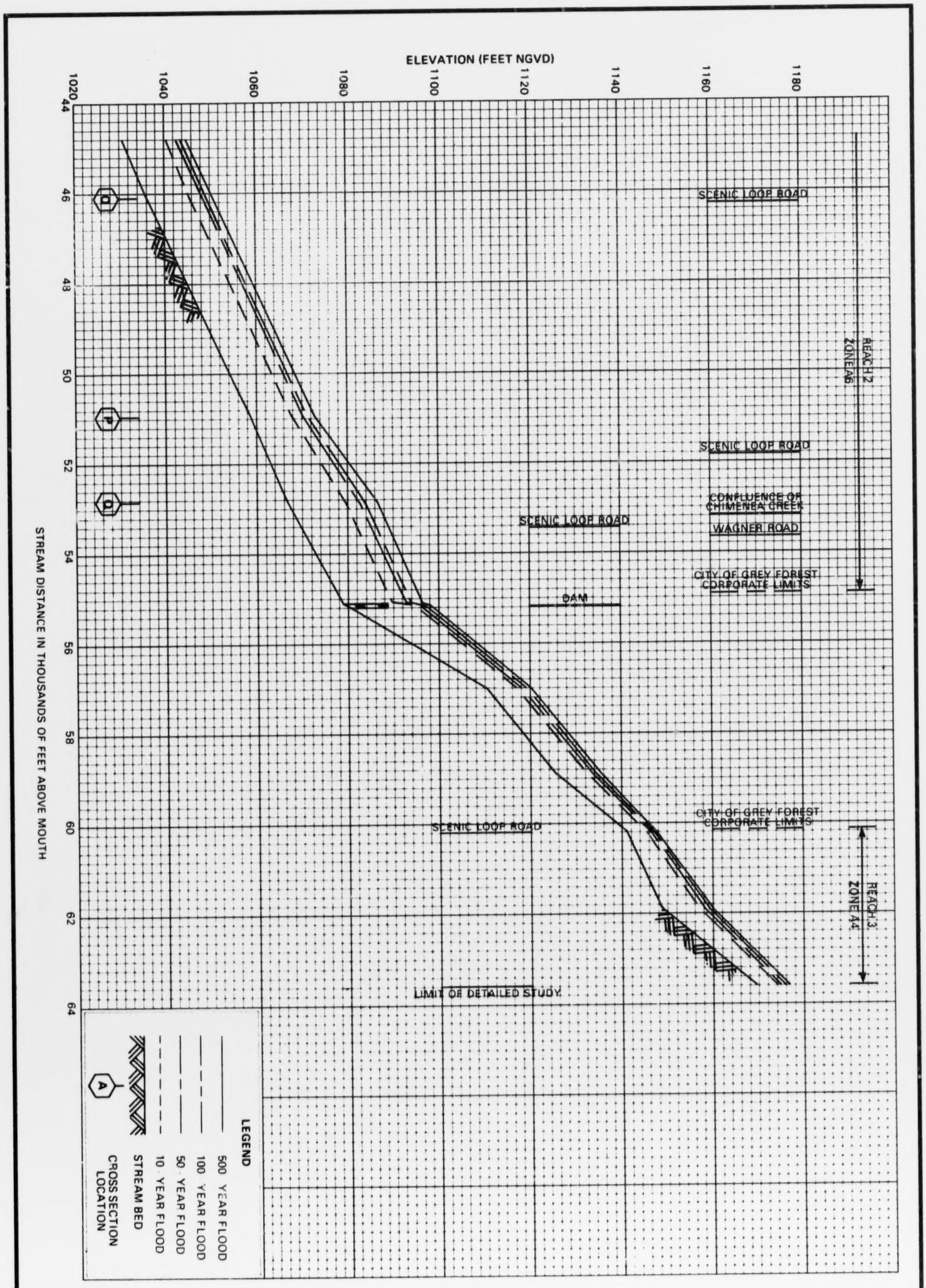
BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

18P

65

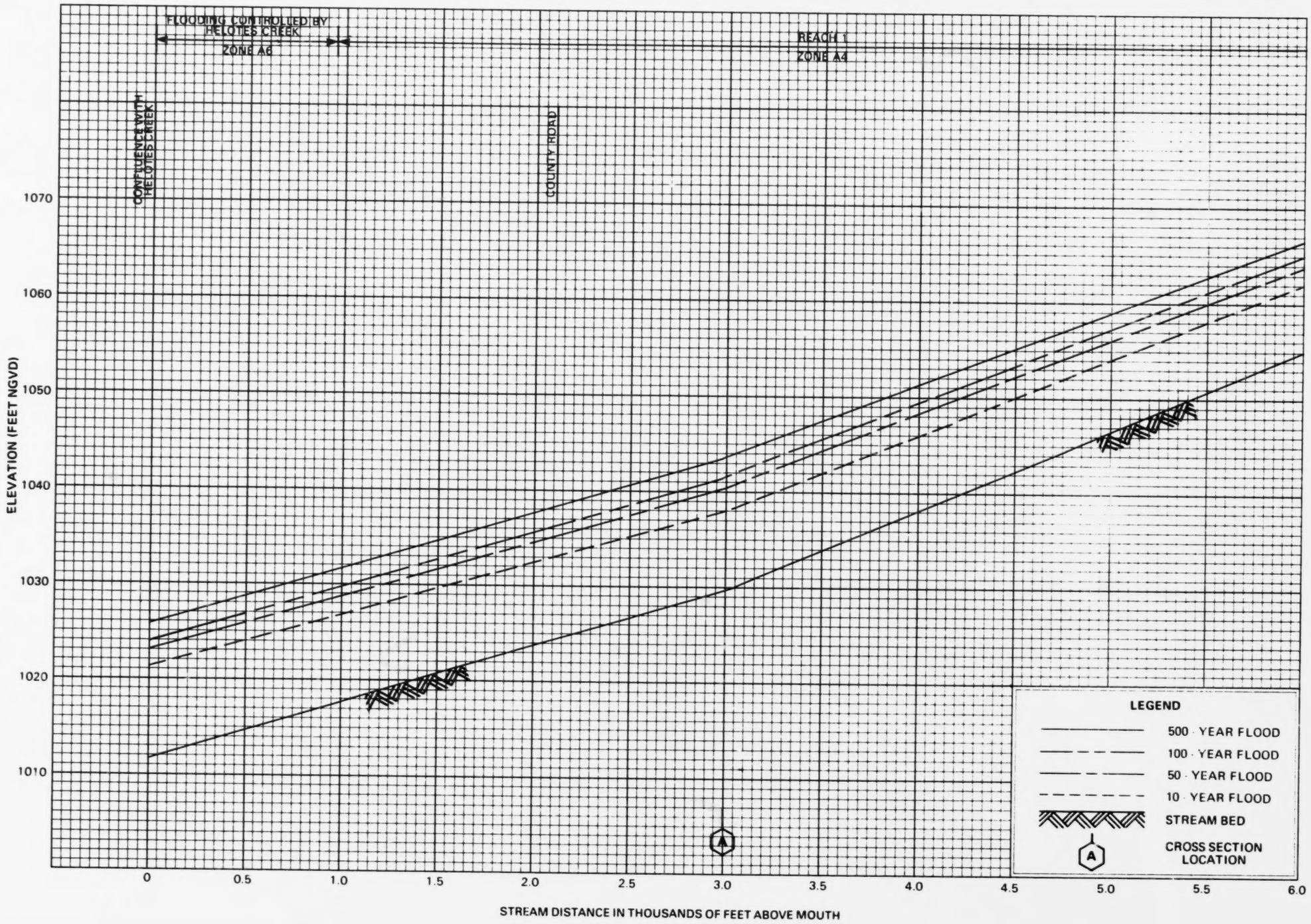


19P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **HELOTES CREEK**



67

20P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX.** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **HELOTES CREEK**



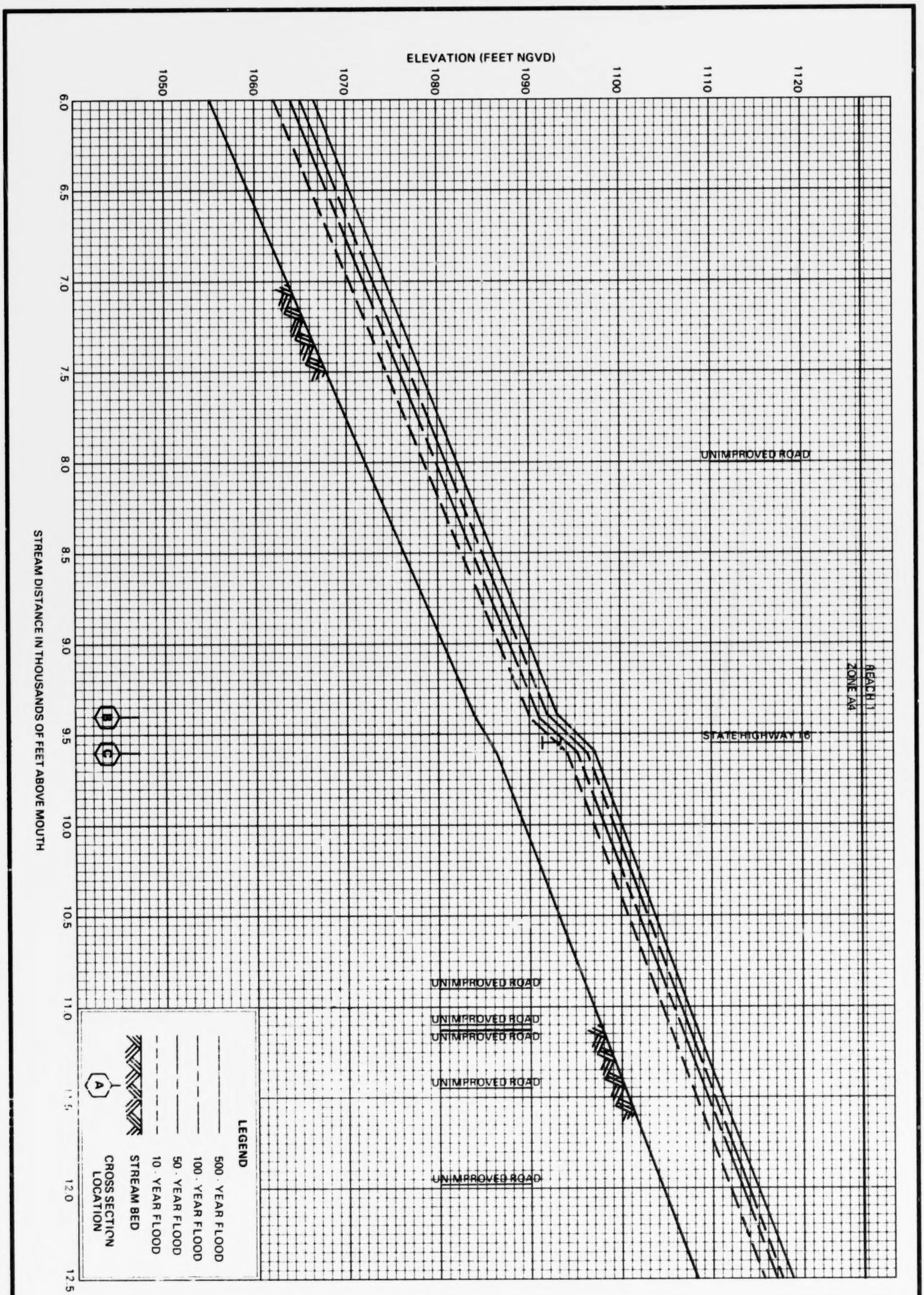
FLOOD PROFILES

LOS REYES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

21P



22P

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

FLOOD PROFILES

LOS REYES CREEK

REACH 1
ZONE AH

STATE HIGHWAY 16

STATE HIGHWAY 16

STATE HIGHWAY 16

ELEVATION (FEET NGVD)

1180
1170
1160
1150
1140
1130
1120
1110
1100

12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5 19.0

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE MOUTH

D E F G H I

LEGEND

500 - YEAR FLOOD
100 - YEAR FLOOD
50 - YEAR FLOOD
10 - YEAR FLOOD
STREAM BED
A — CROSS SECTION LOCATION

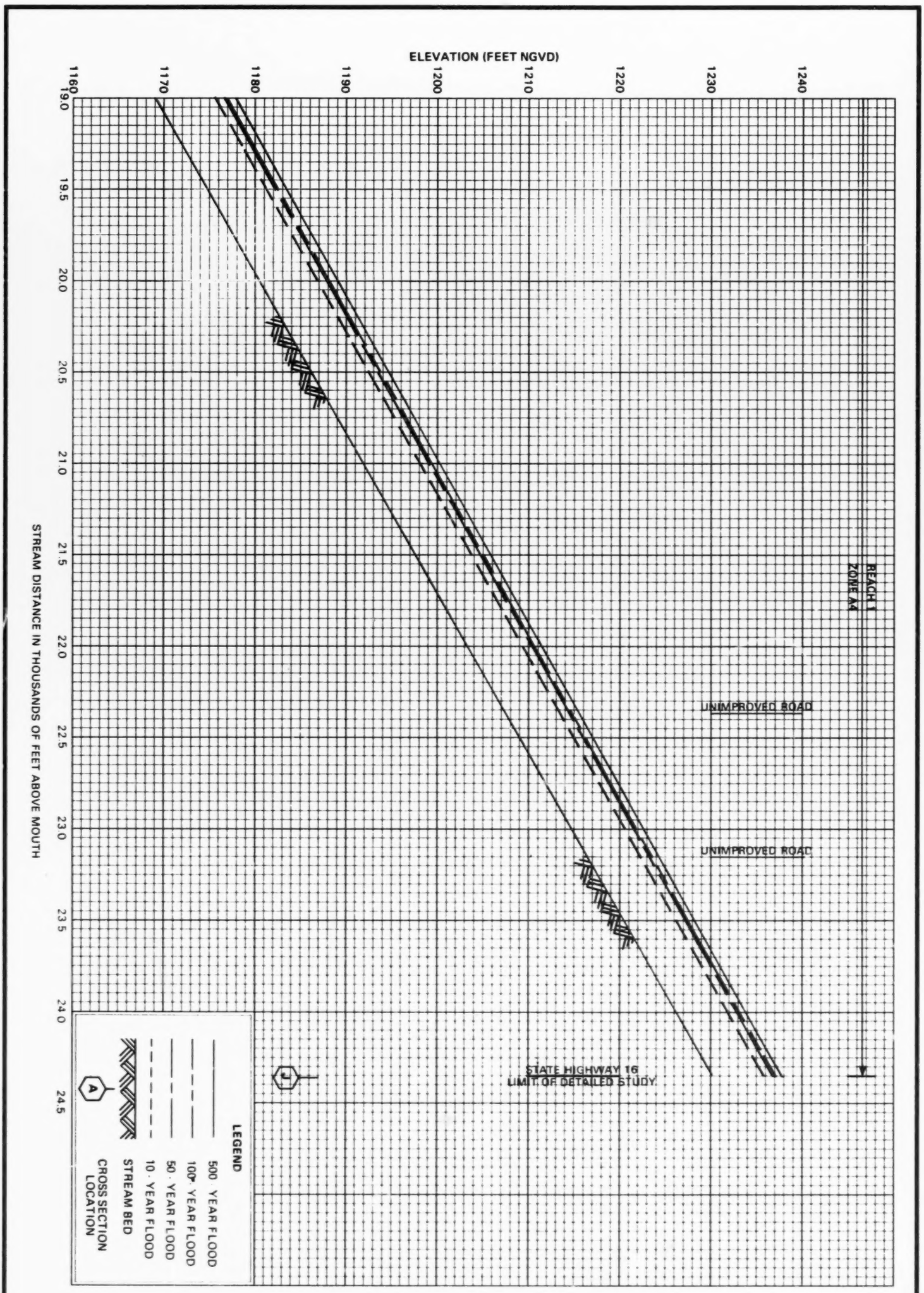
FLOOD PROFILES

LOS REYES CREEK

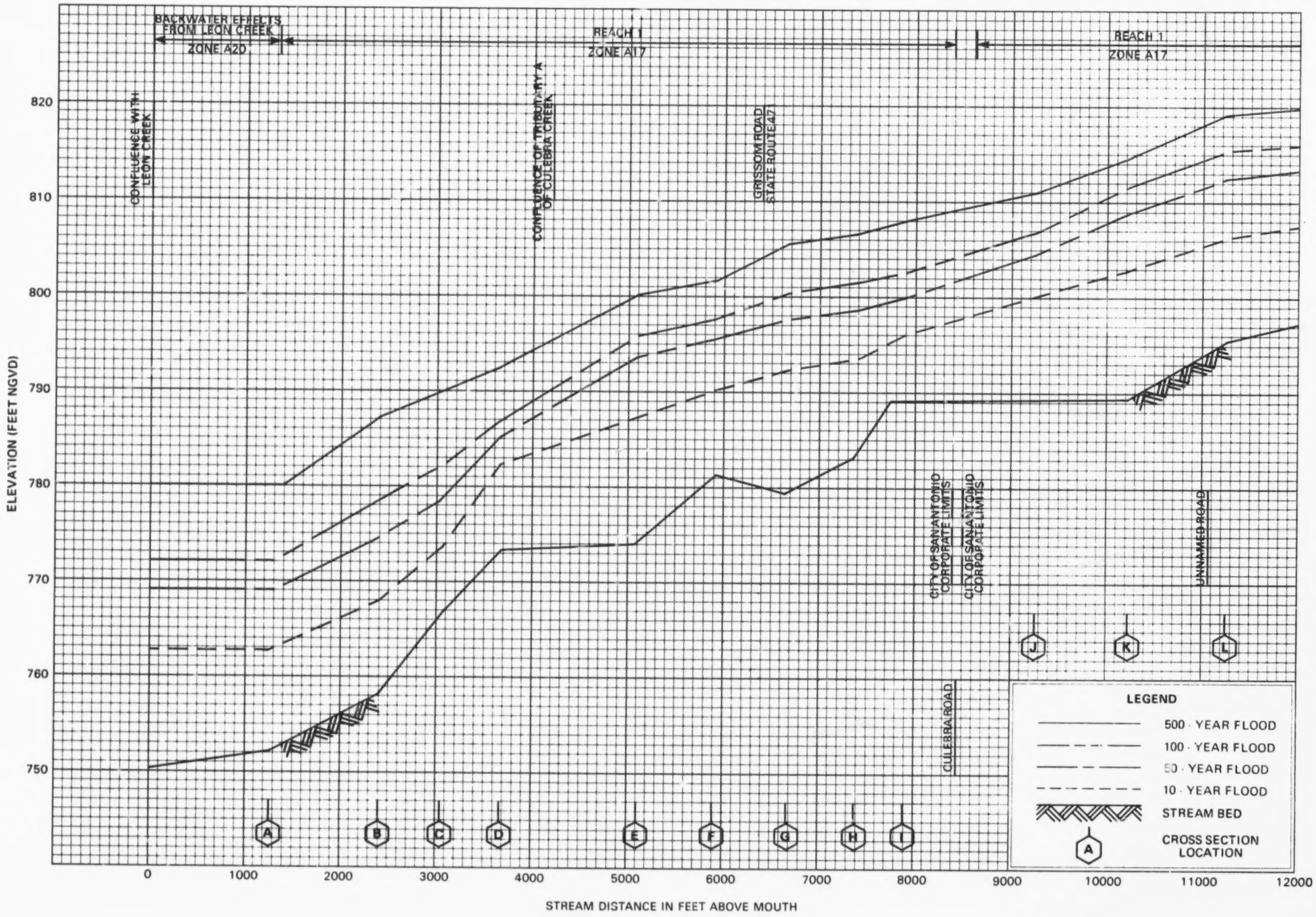
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

23P



24P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **LOS REYES CREEK**



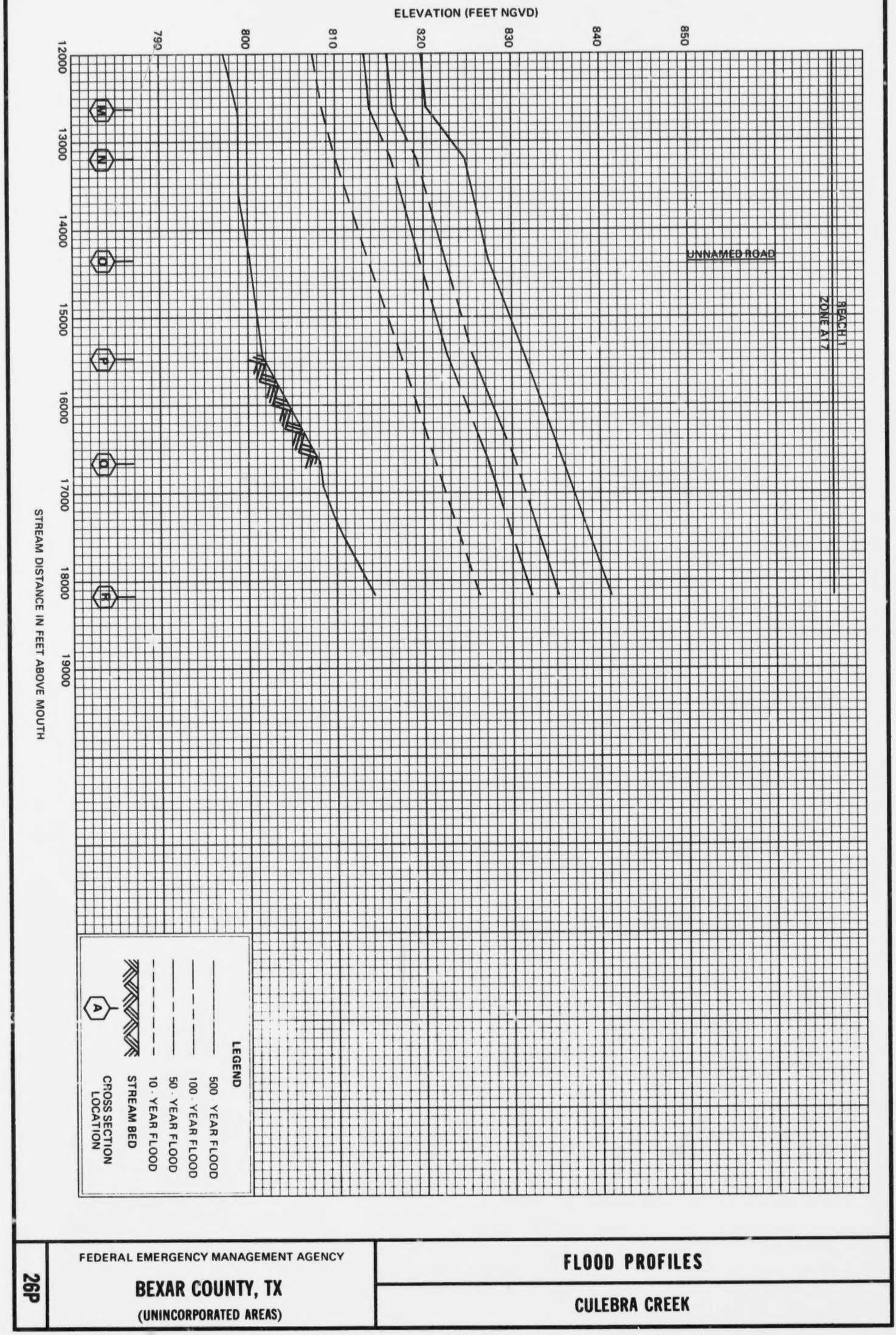
FLOOD PROFILES

CULEBRA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

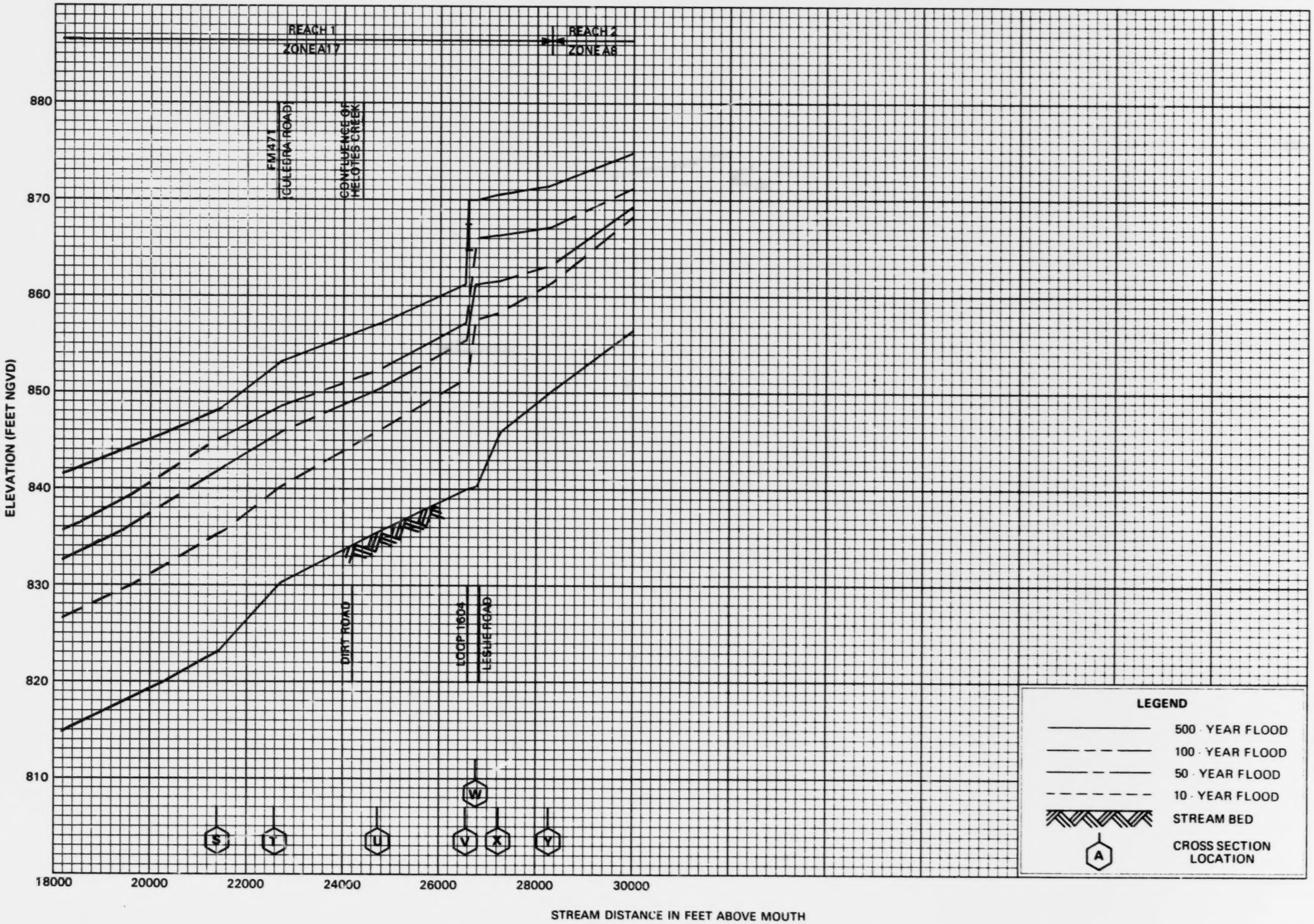
BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

25P



23

26P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX** **(UNINCORPORATED AREAS)**	**FLOOD PROFILES** **CULEBRA CREEK**



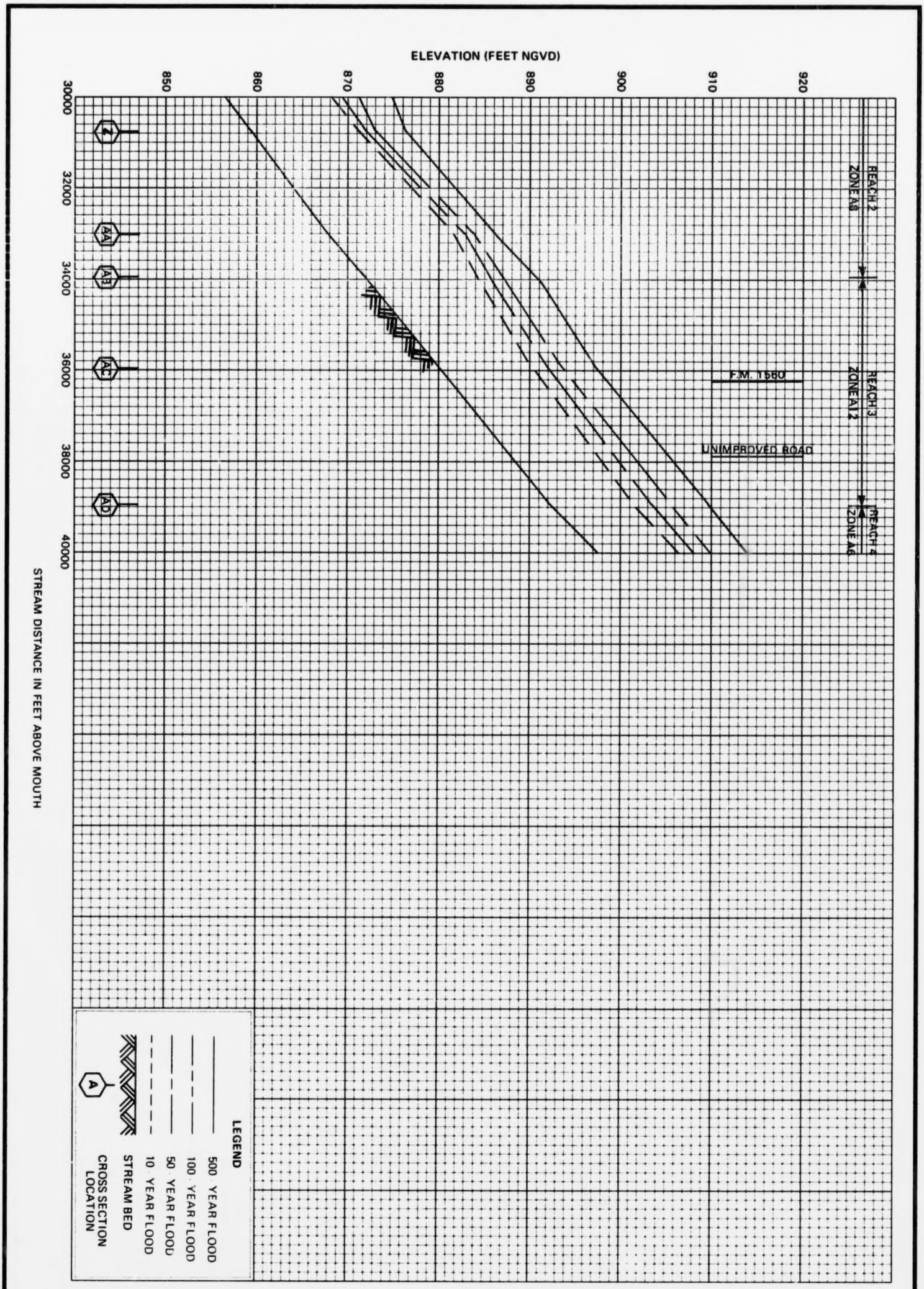
FLOOD PROFILES

CULEBRA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

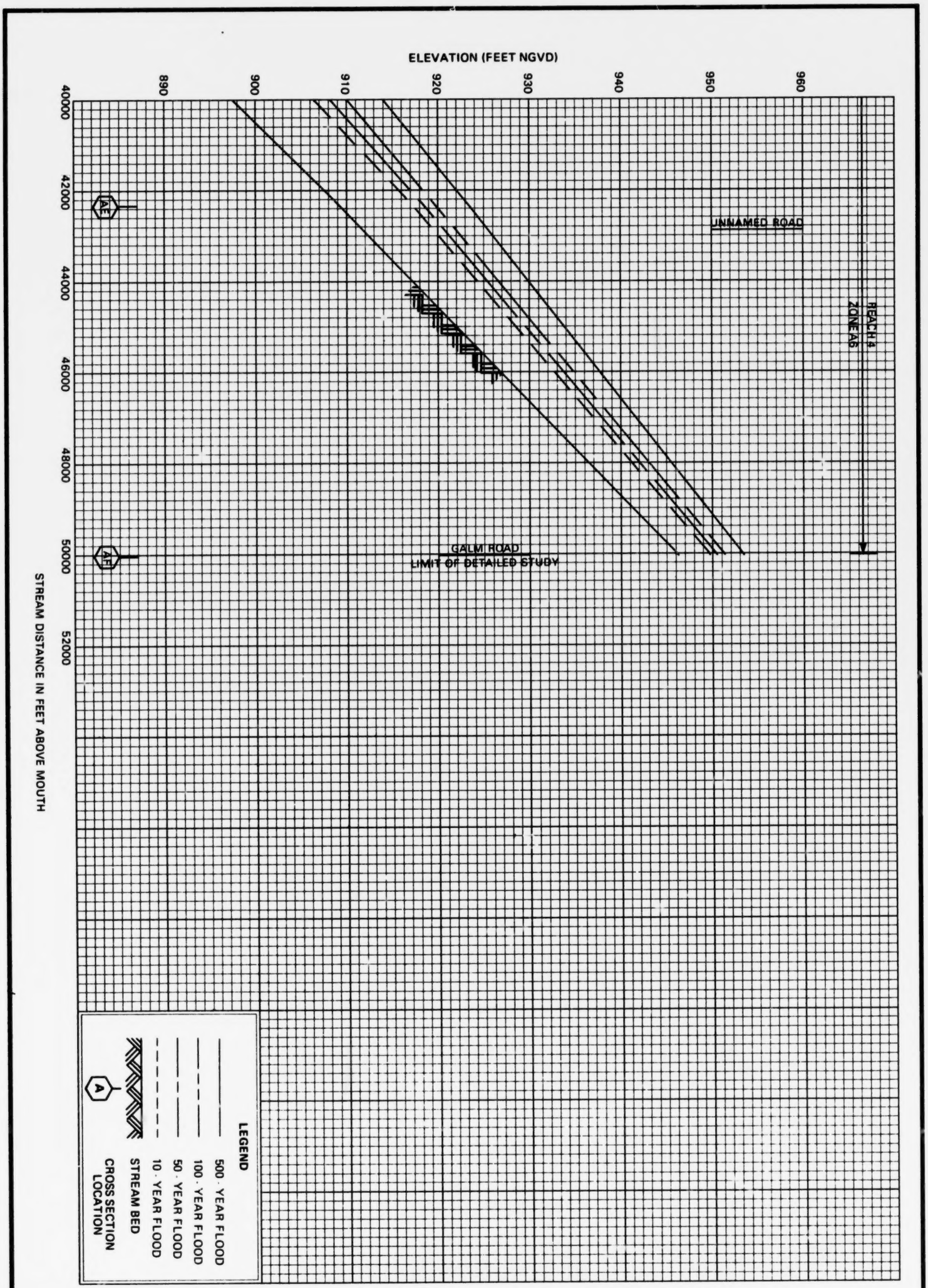
BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

27P



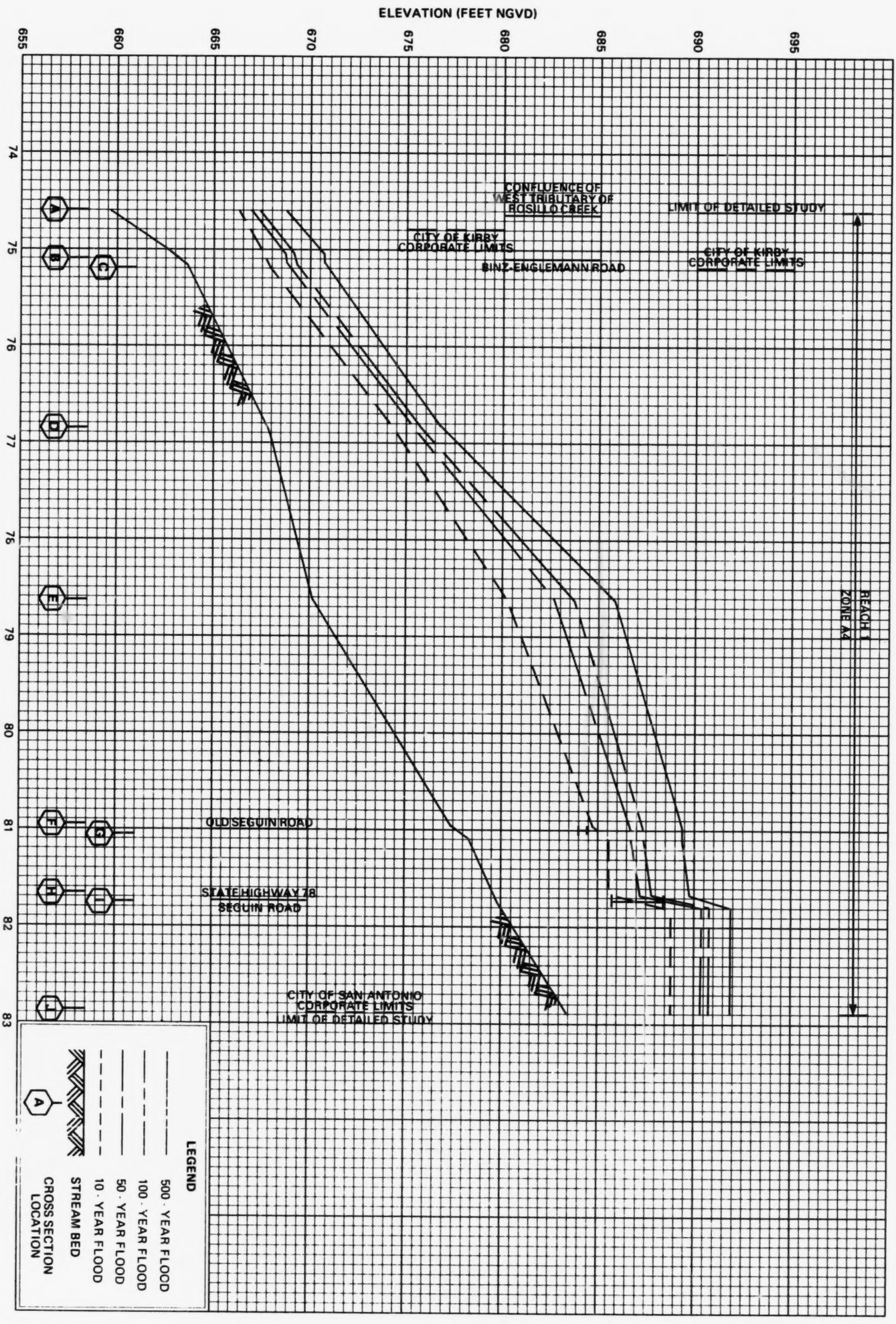
25

28P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **CULEBRA CREEK**



96

29P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **CULEBRA CREEK**



21

30P

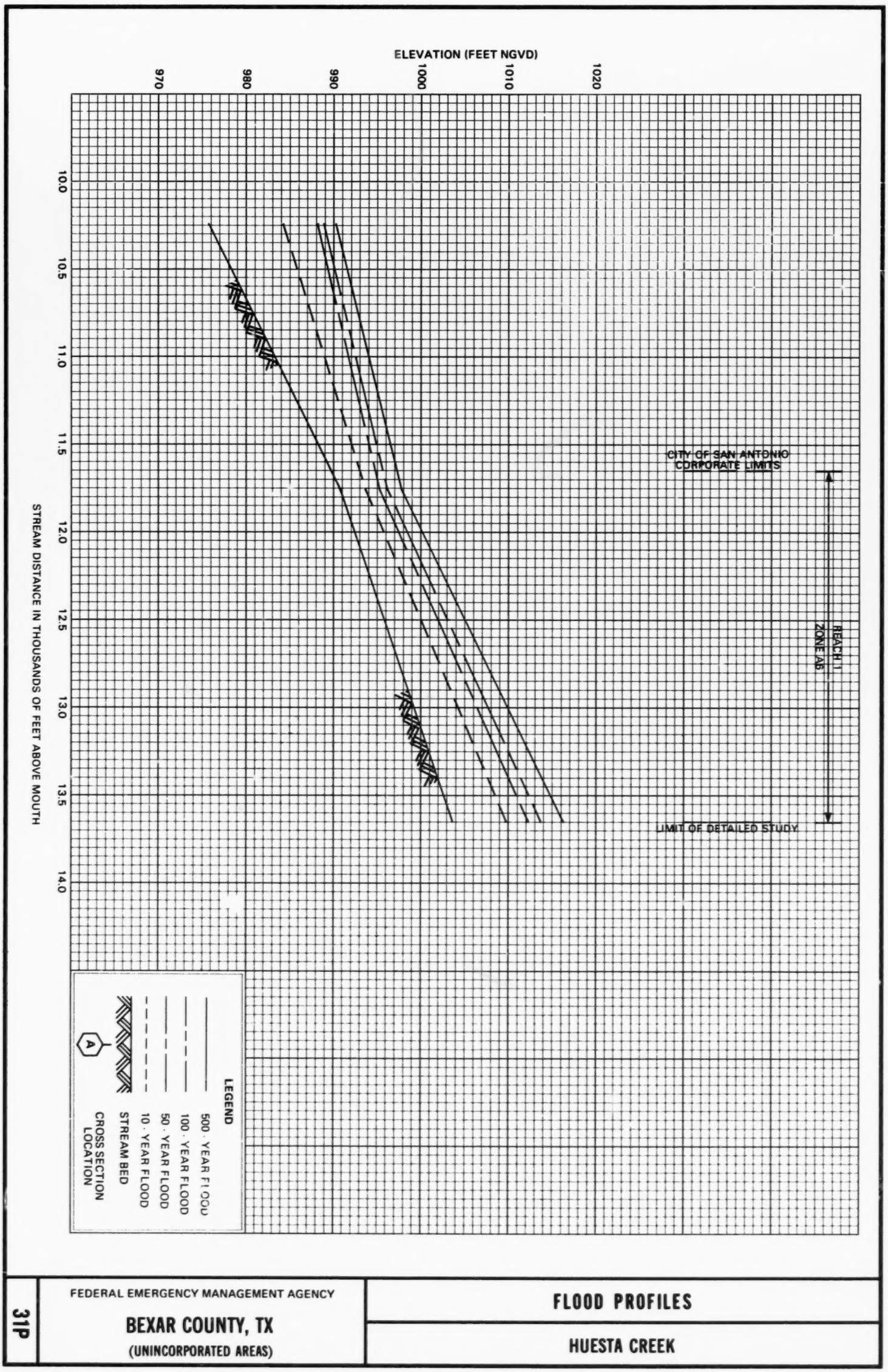
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

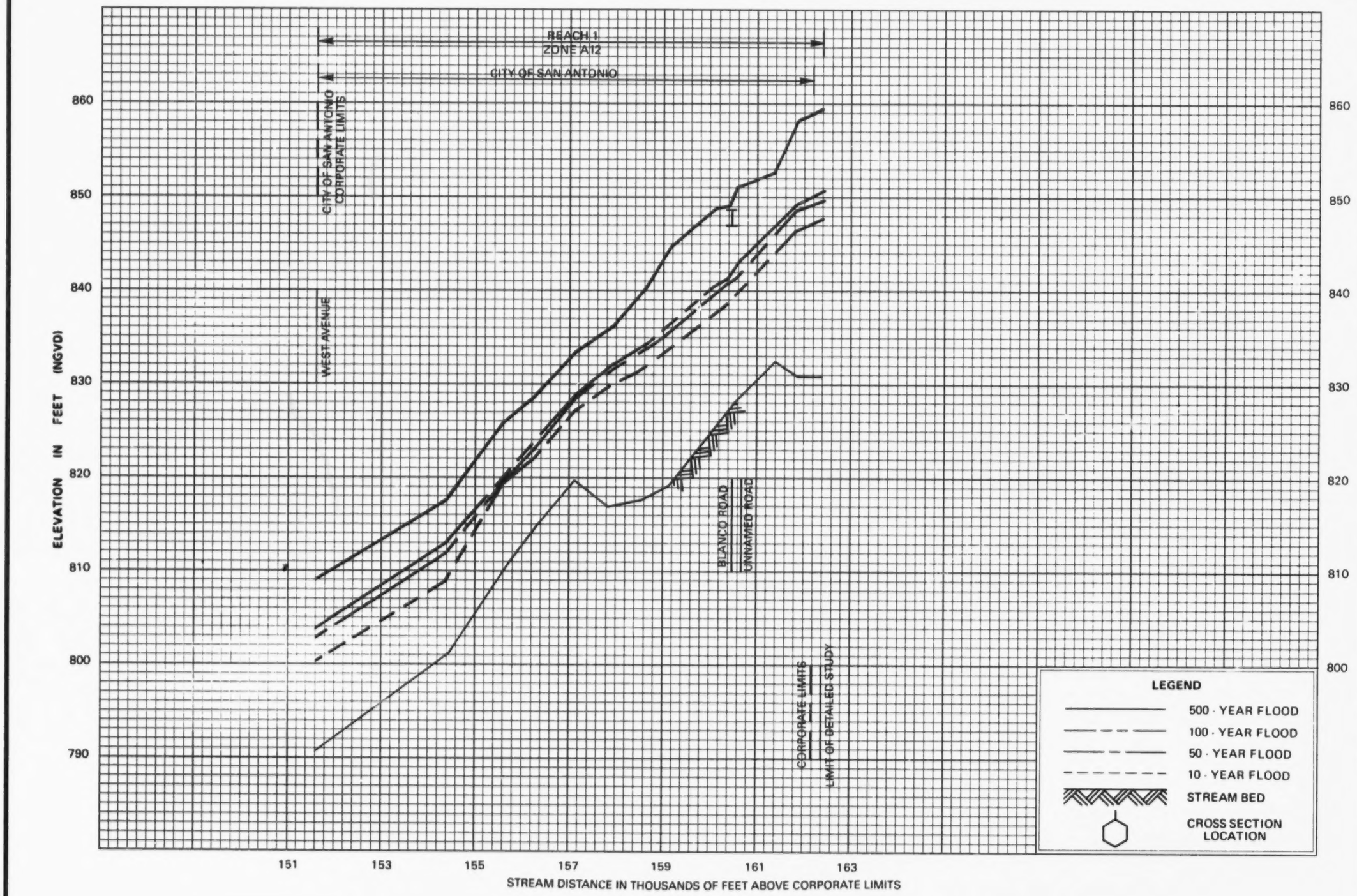
(UNINCORPORATED AREAS)

FLOOD PROFILES

ROSILLO CREEK



31P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **HUESTA CREEK**



FLOOD PROFILES

SALADO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

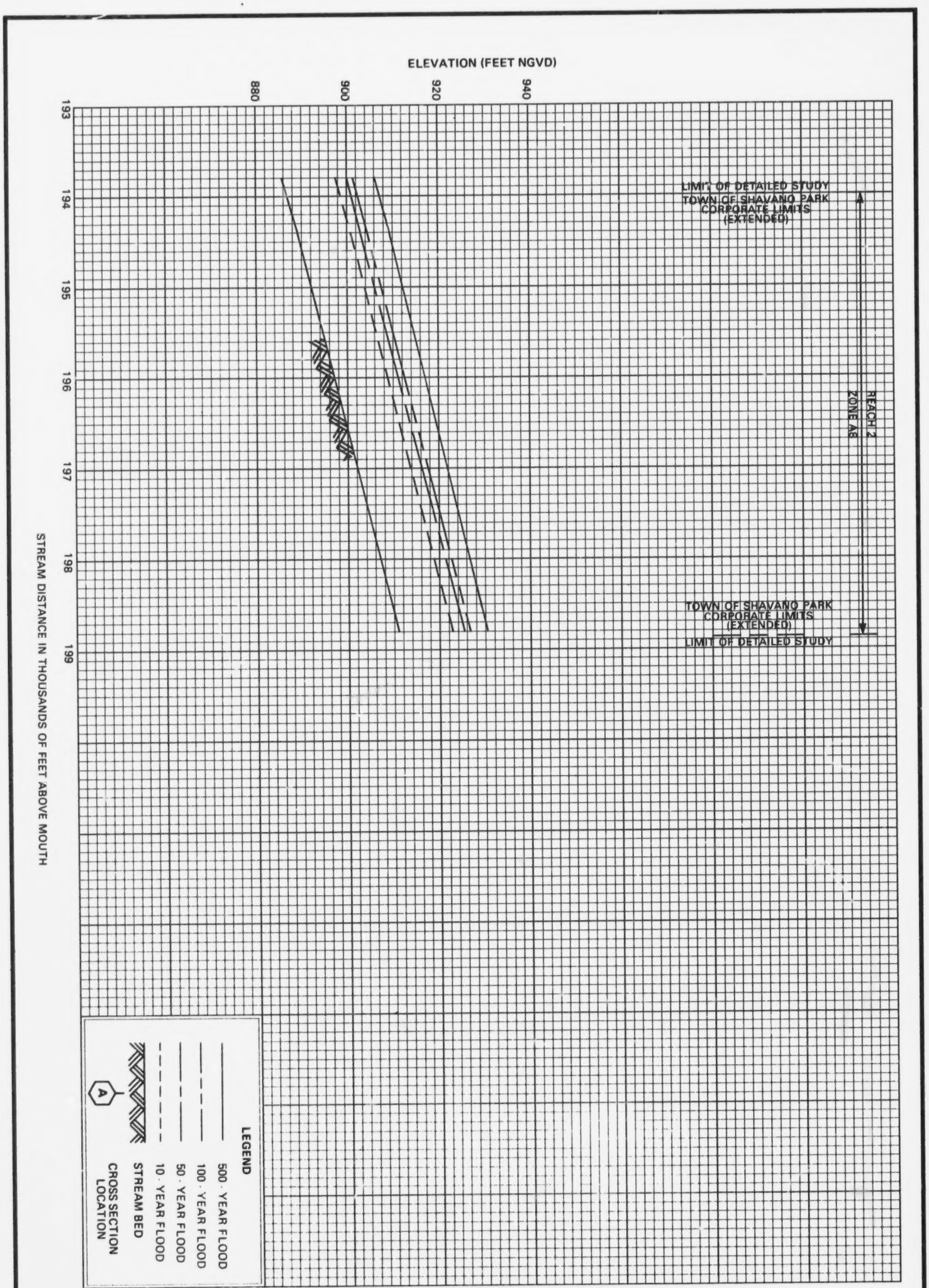
BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

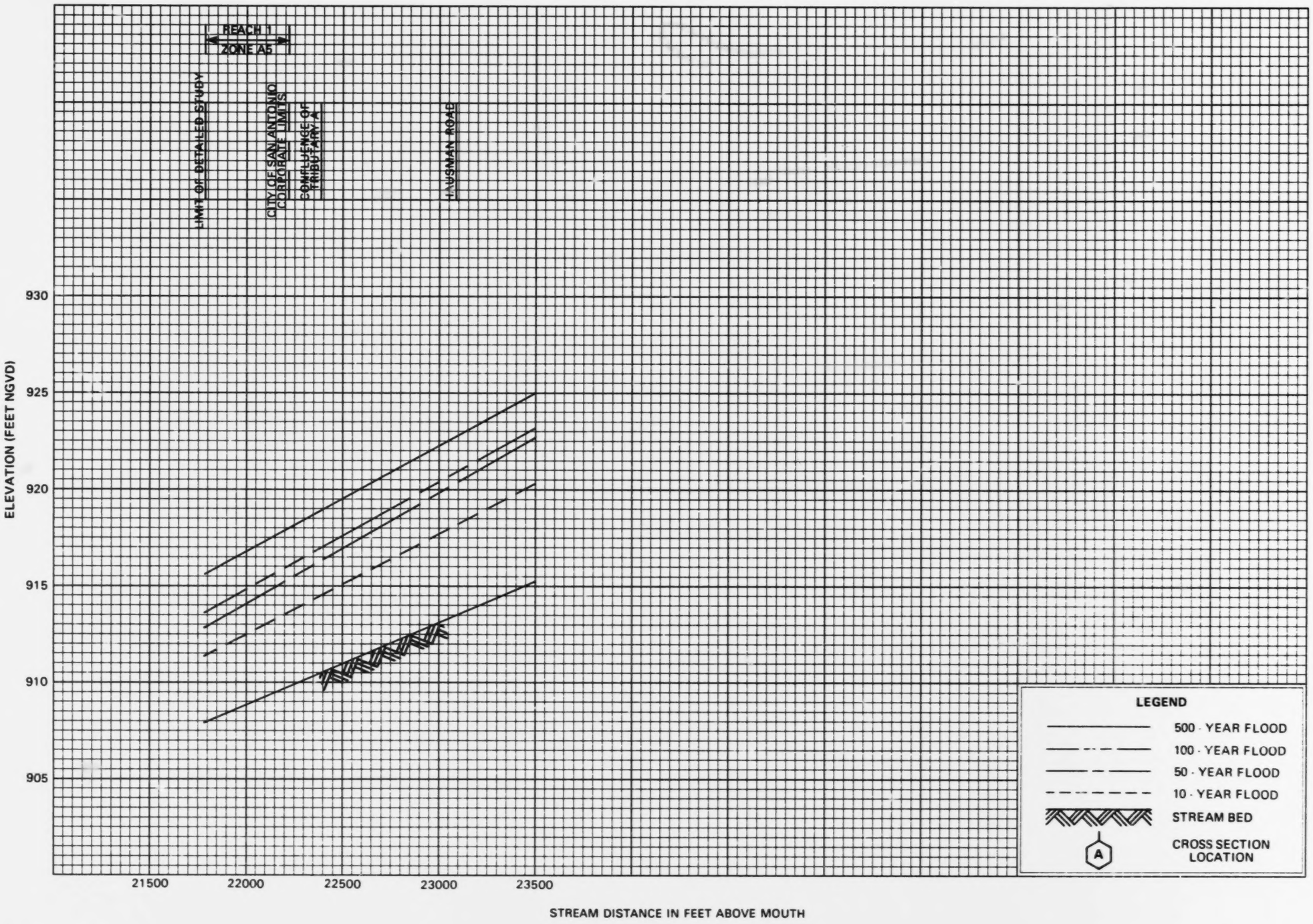
32P

135365

A & E INC. BALTIMORE



33P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **SALADO CREEK**



FLOOD PROFILES

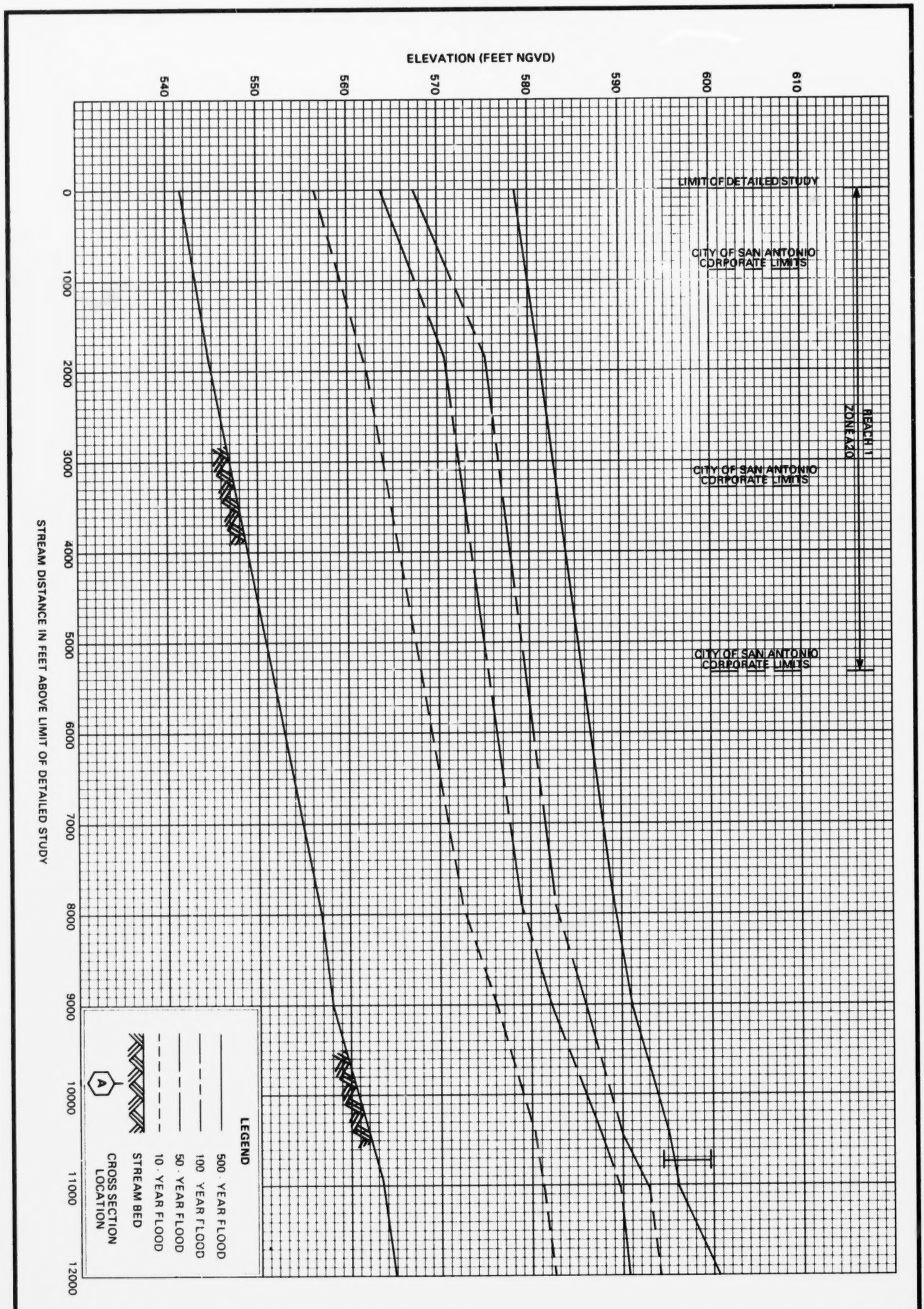
FRENCH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

34P



82

35P

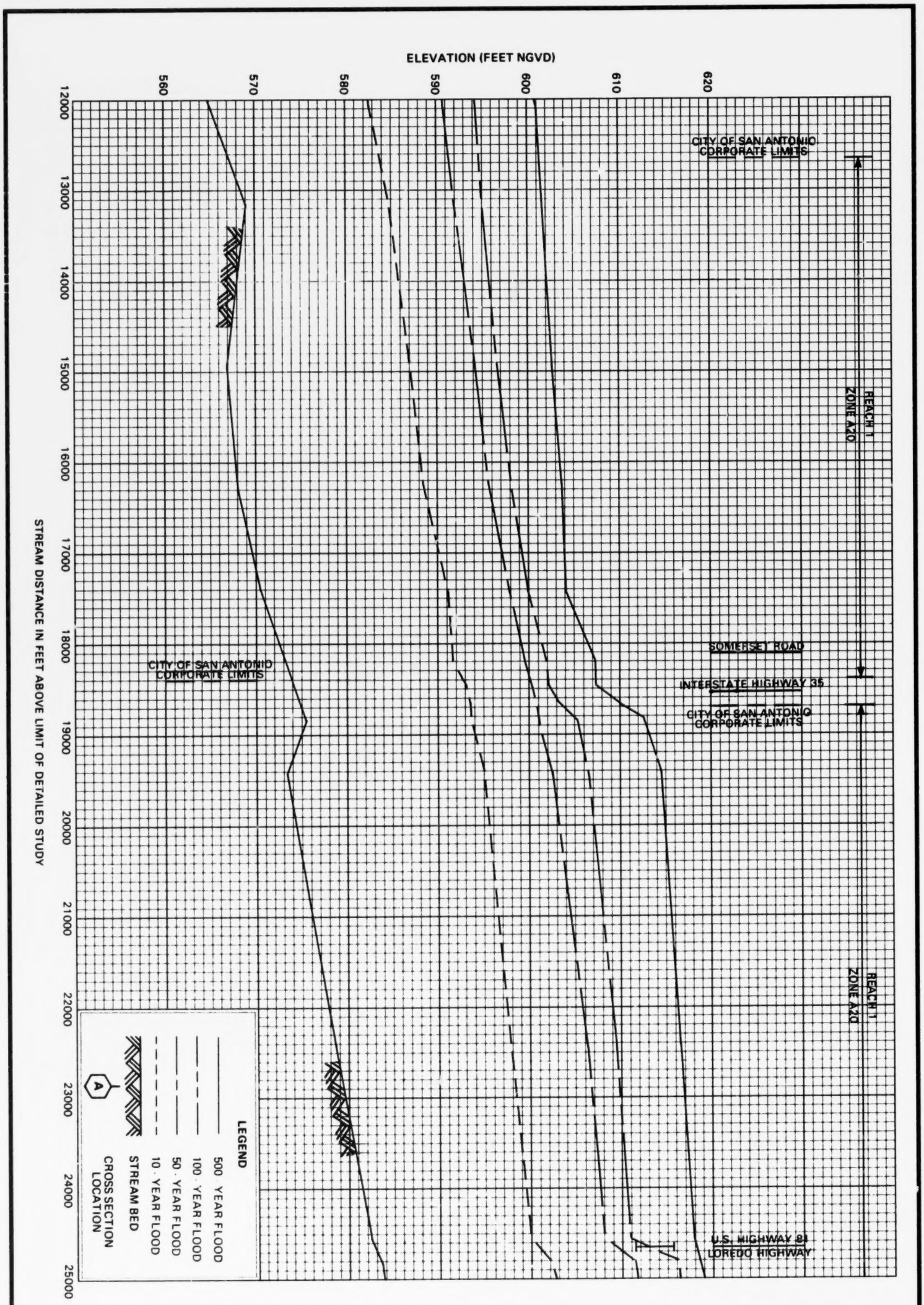
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

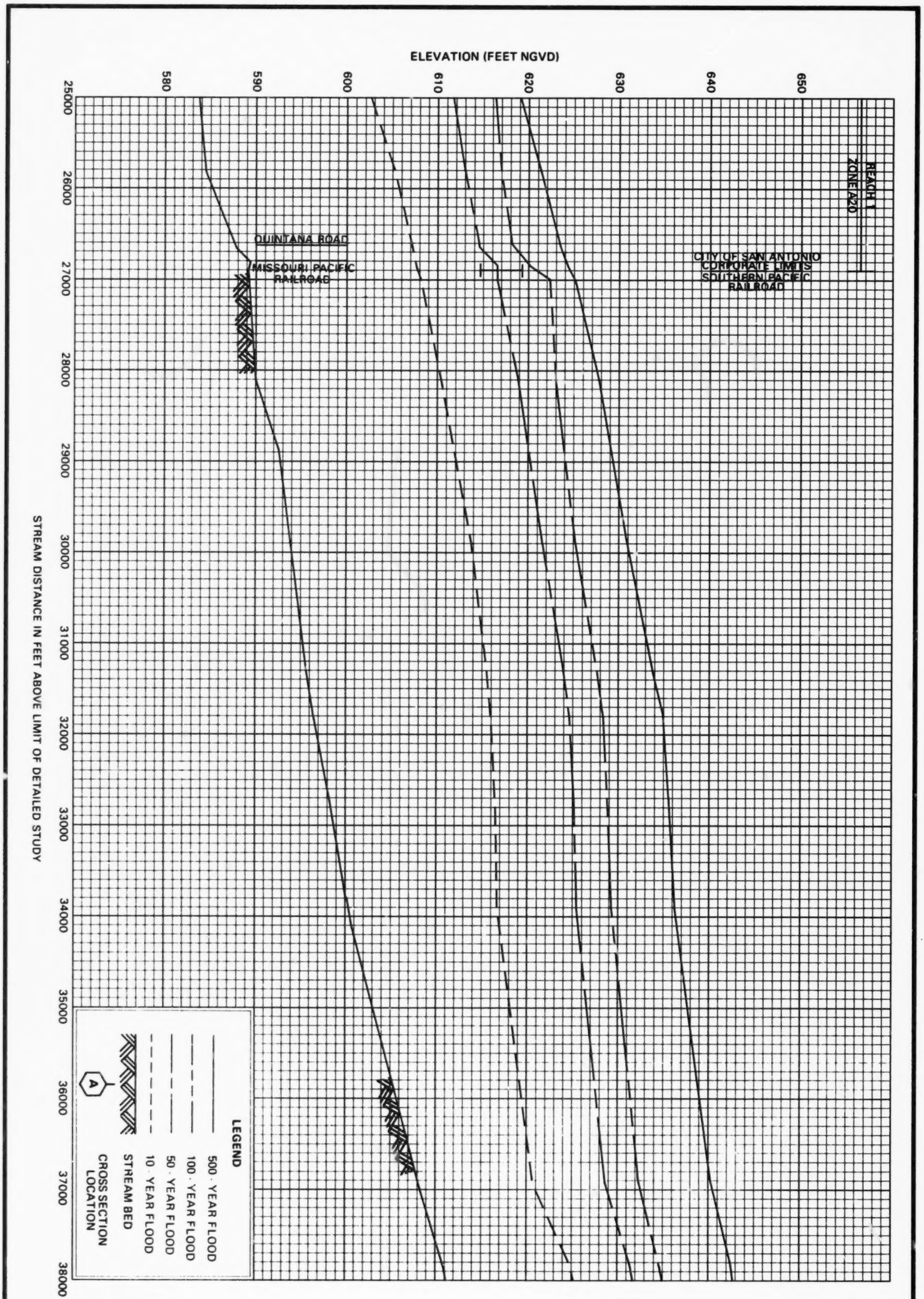
FLOOD PROFILES

LEON CREEK



E3

36P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **LEON CREEK**



37P

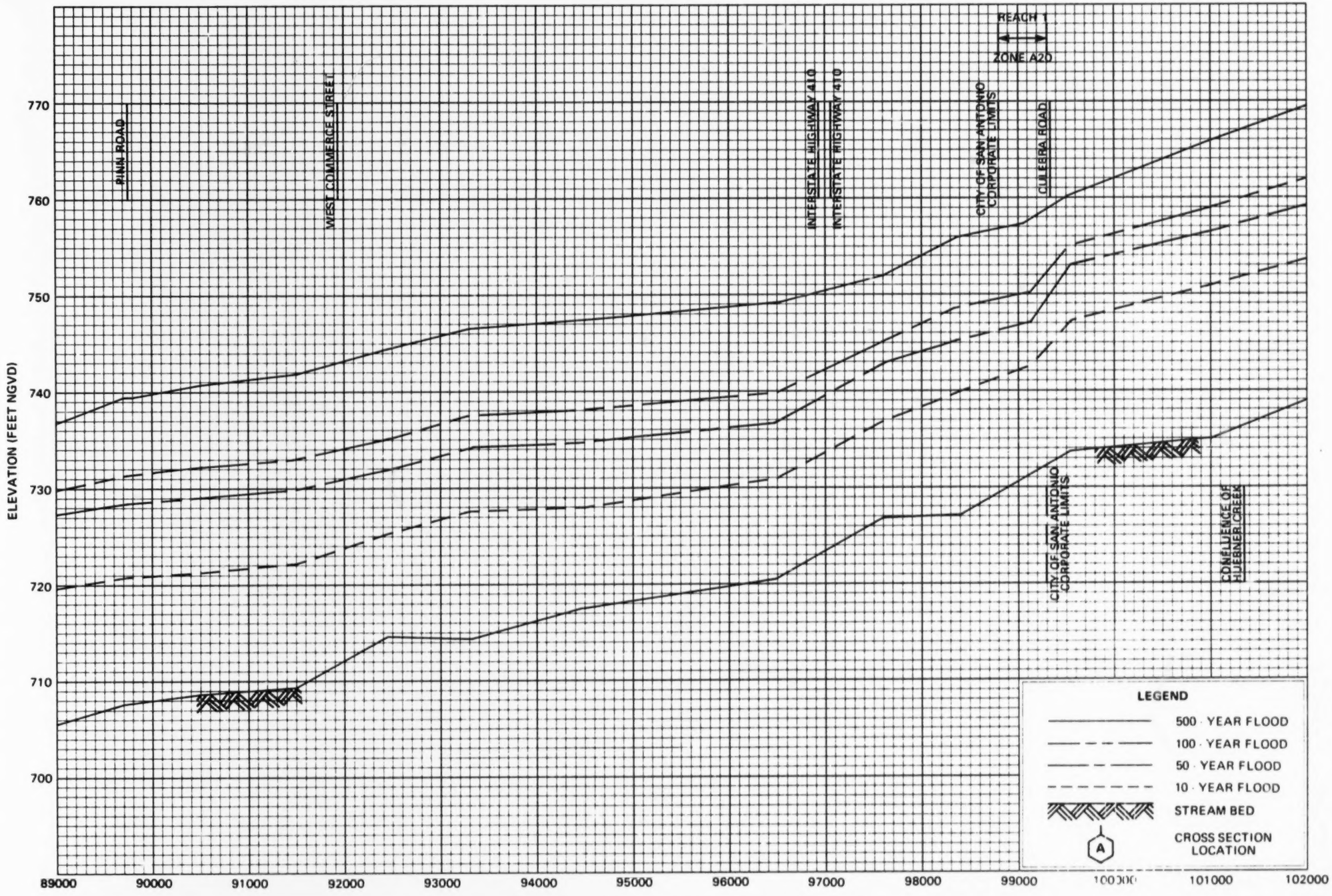
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

FLOOD PROFILES

LEON CREEK



FLOOD PROFILES

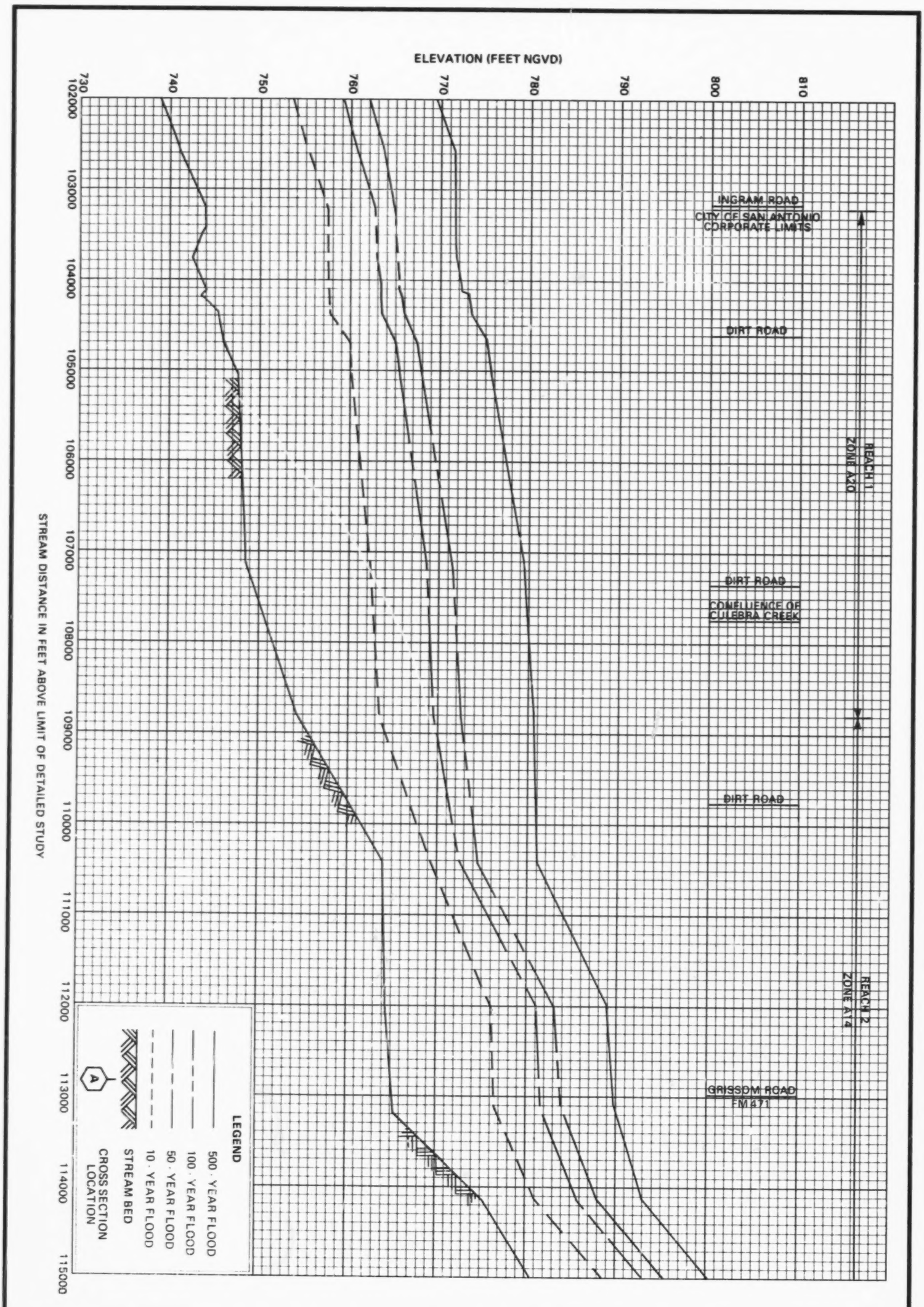
LEON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

38P

85



39P

FEDERAL EMERGENCY MANAGEMENT AGENCY

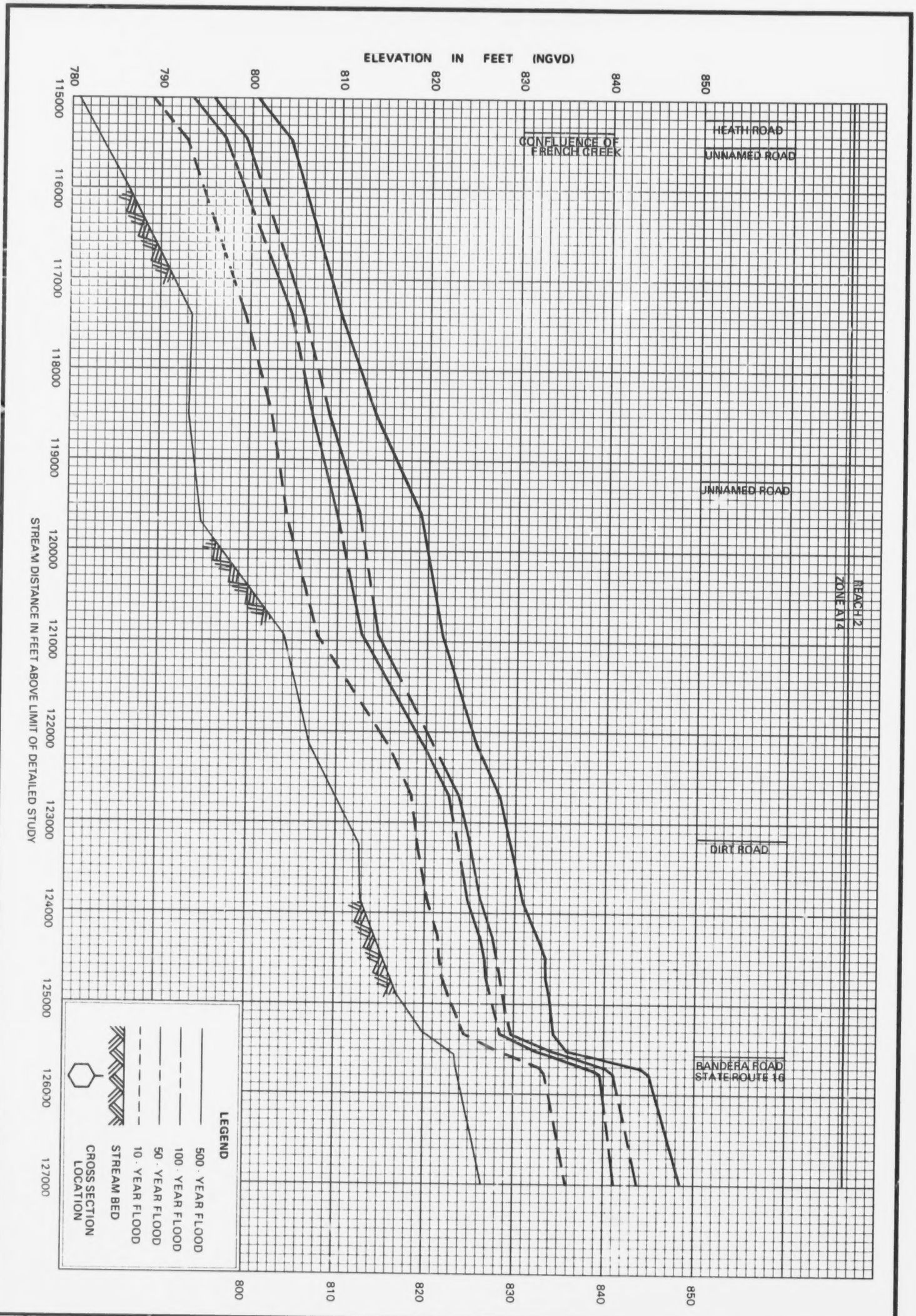
BEXAR COUNTY, TX

(UNINCORPORATED AREAS)

FLOOD PROFILES

LEON CREEK

135365



40P

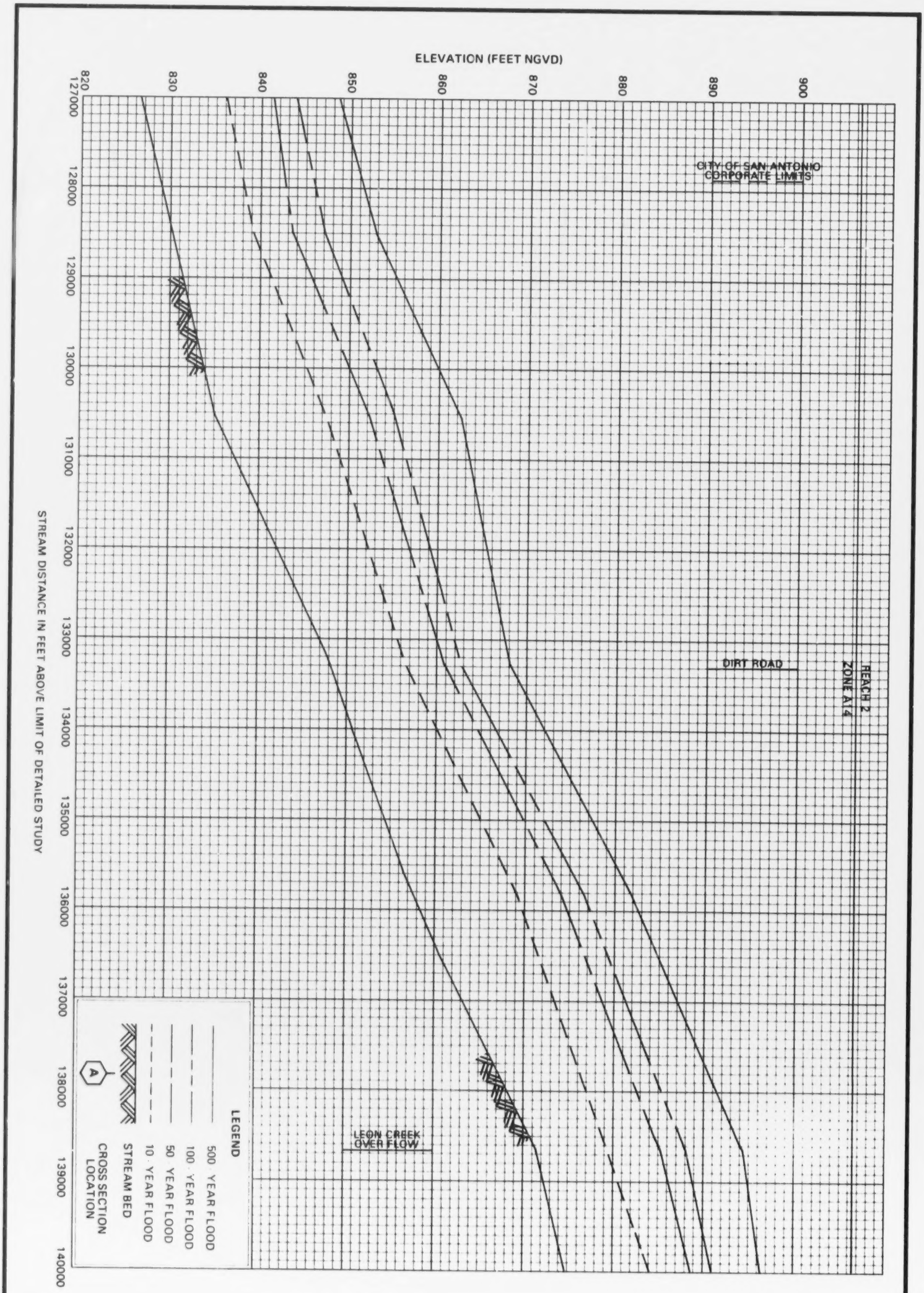
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

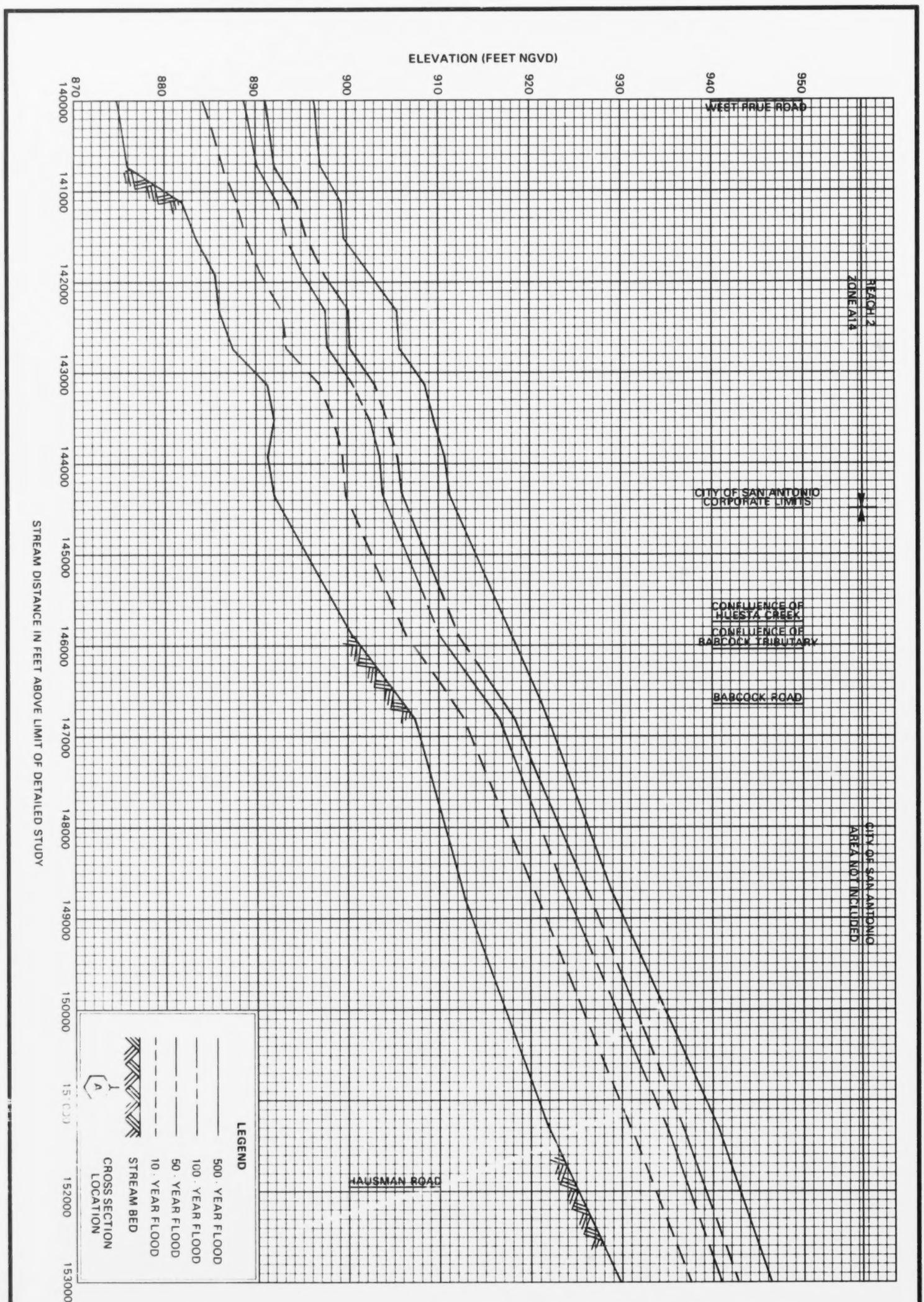
(UNINCORPORATED AREAS)

FLOOD PROFILES

LEON CREEK



41P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **LEON CREEK**



42P

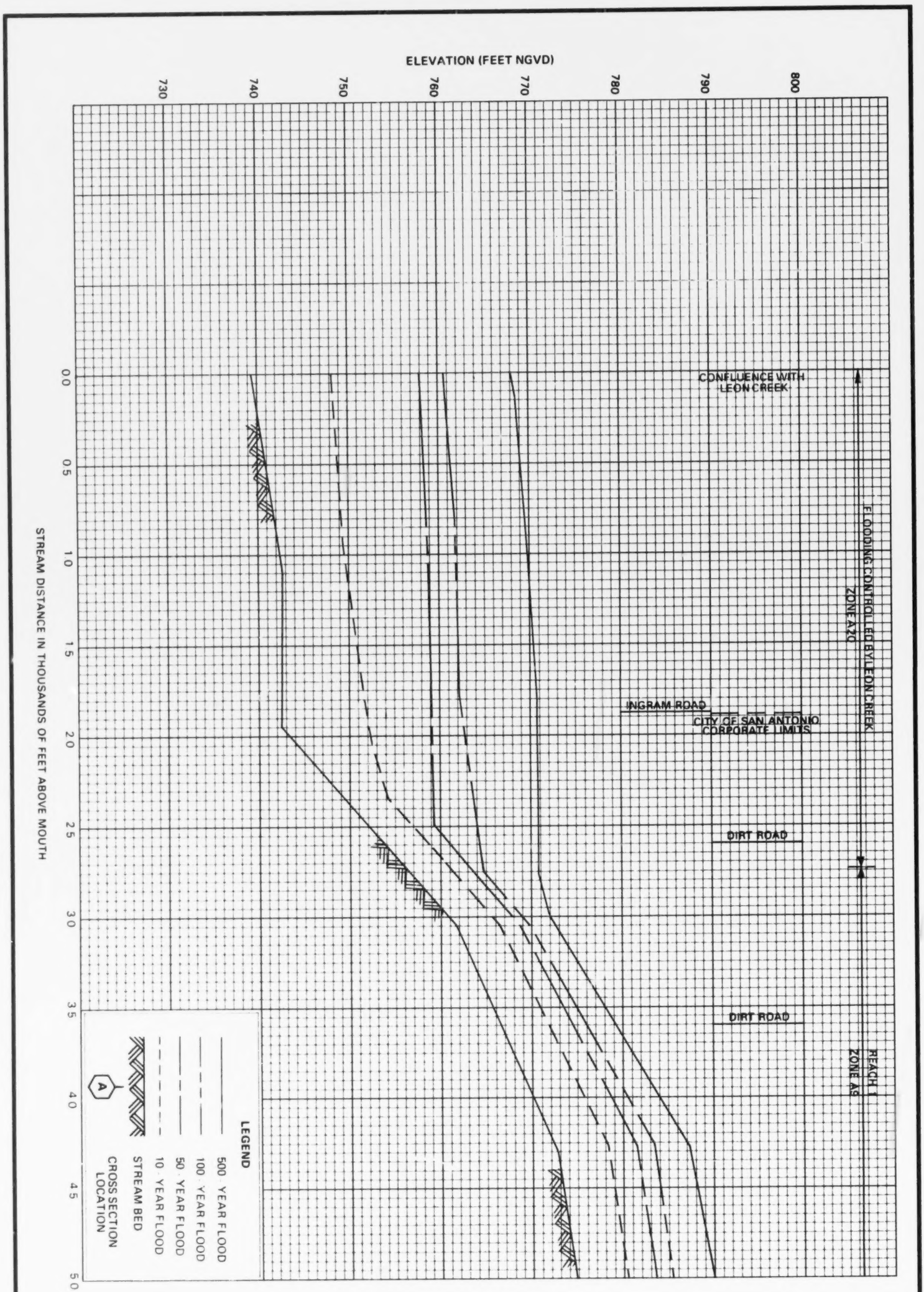
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX

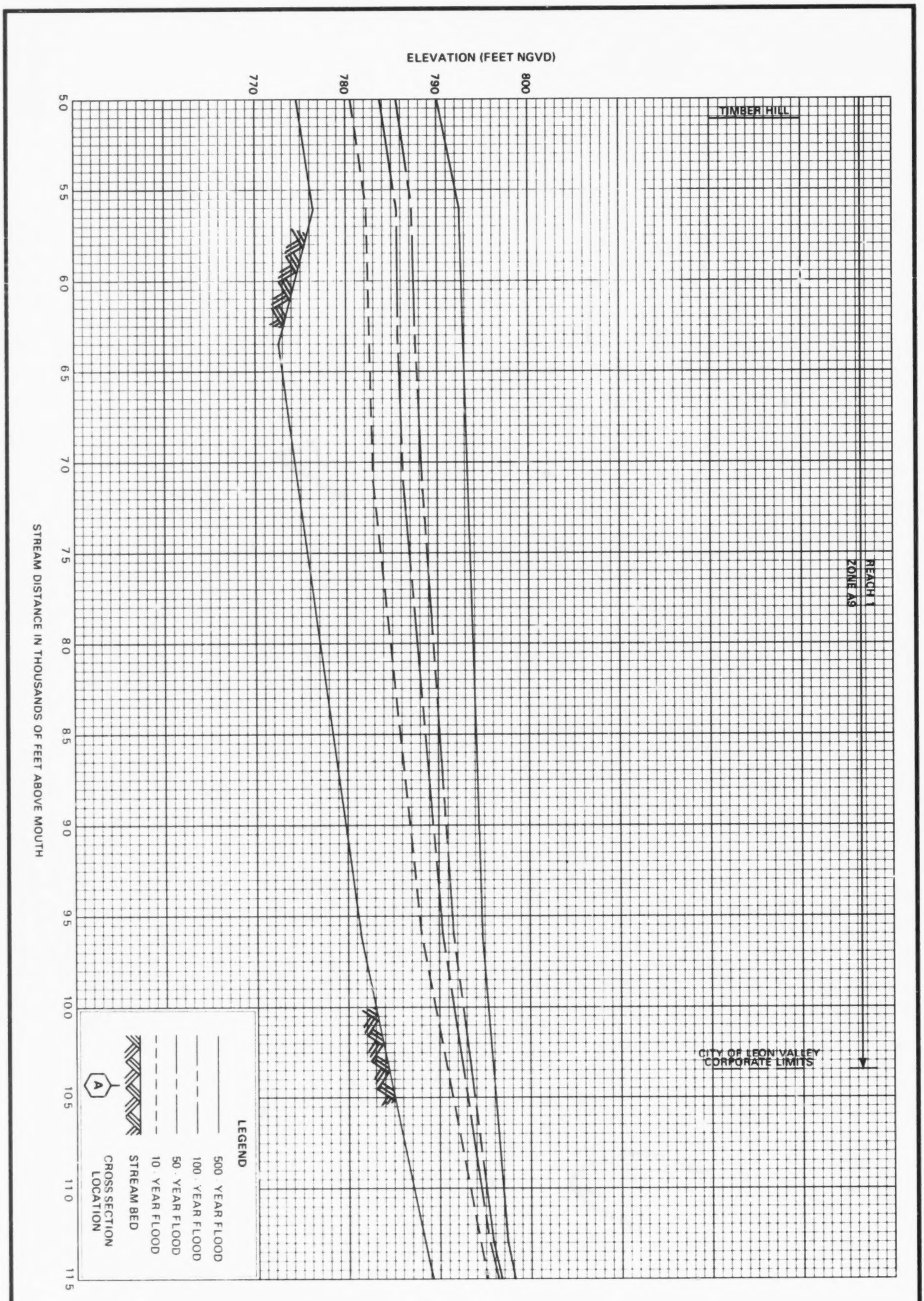
(UNINCORPORATED AREAS)

FLOOD PROFILES

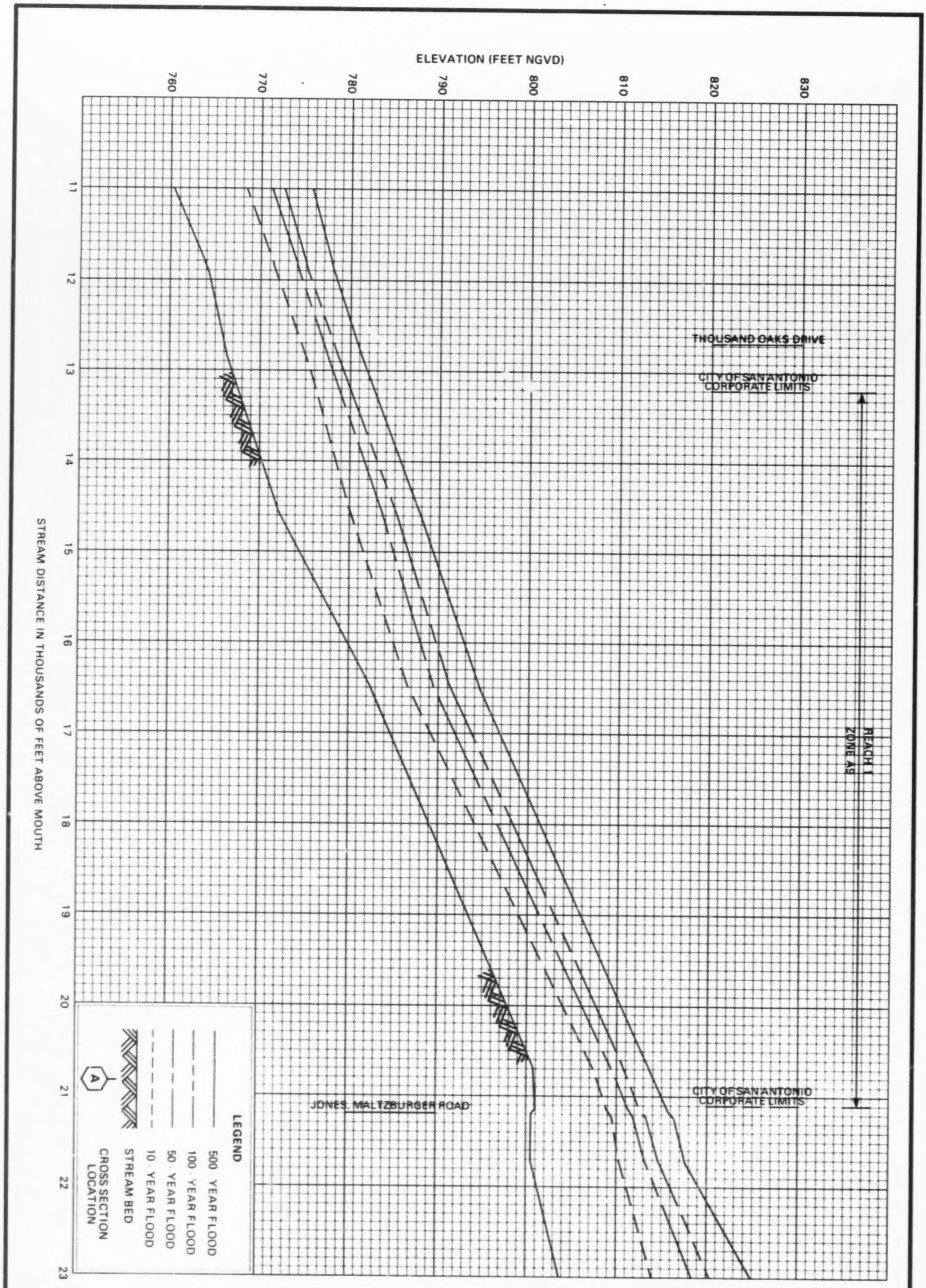
LEON CREEK



43P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **HUEBNER CREEK**

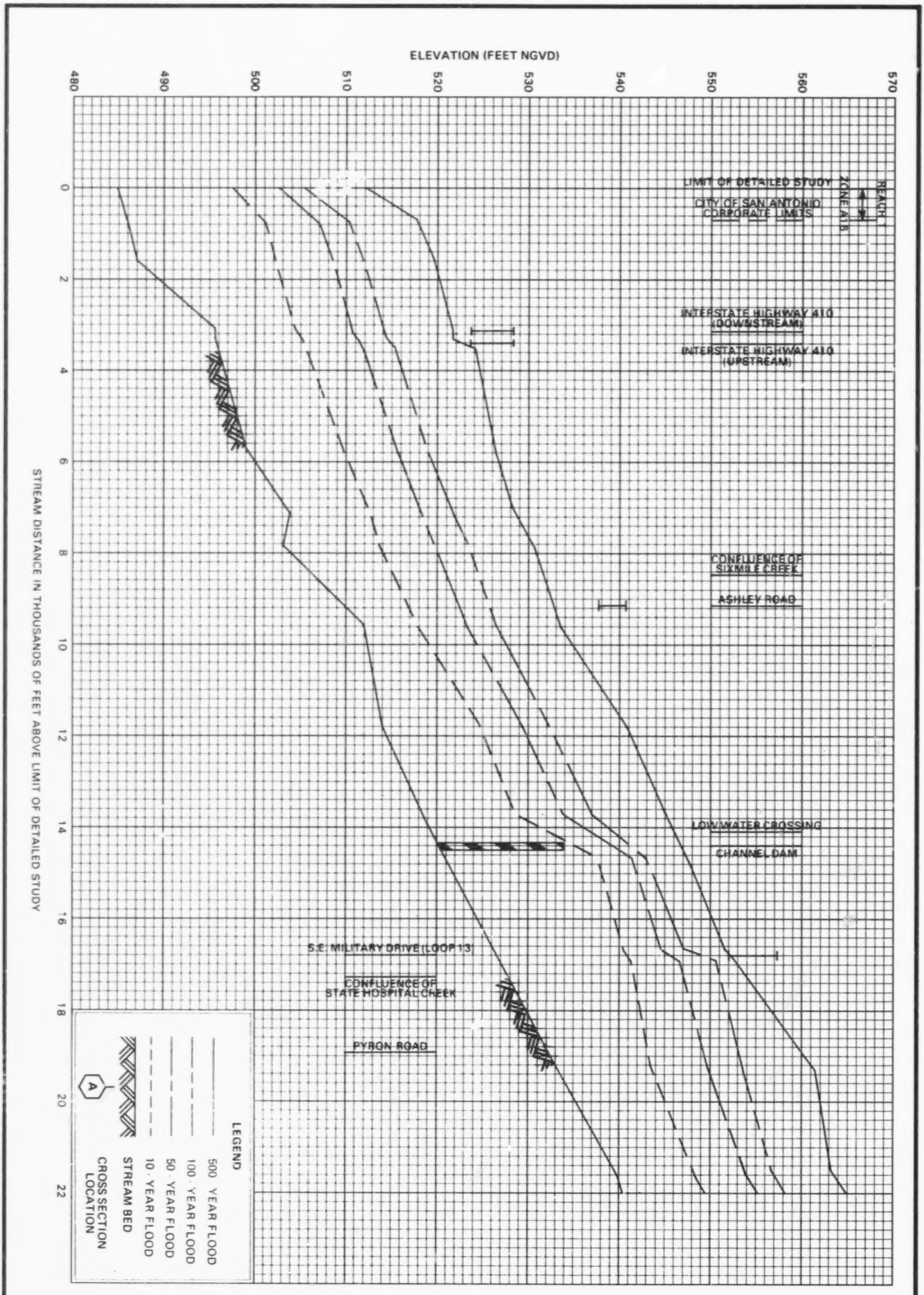


44P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **HUEBNER CREEK**



52

45P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **MUD CREEK**


ELEVATION (FEET NGVD)
480
490
500
510
520
530
540
550
560
570
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE LIMIT OF DETAILED STUDY
0
2
4
6
8
10
12
14
16
18
20
22
LIMIT OF DETAILED STUDY
CITY OF SAN ANTONIO CORPORATE LIMITS
REACH
ZONE AE
INTERSTATE HIGHWAY 410 (DOWNSTREAM)
INTERSTATE HIGHWAY 410 (UPSTREAM)
CONFLUENCE OF SIXMILE CREEK
ASHLEY ROAD
LOW WATER CROSSING
CHANNEL DAM
S.E. MILITARY DRIVE (LOOP 13)
CONFLUENCE OF STATE HOSPITAL CREEK
PYRON ROAD
LEGEND
500 - YEAR FLOOD
100 - YEAR FLOOD
50 - YEAR FLOOD
10 - YEAR FLOOD
STREAM BED
A
CROSS SECTION LOCATION

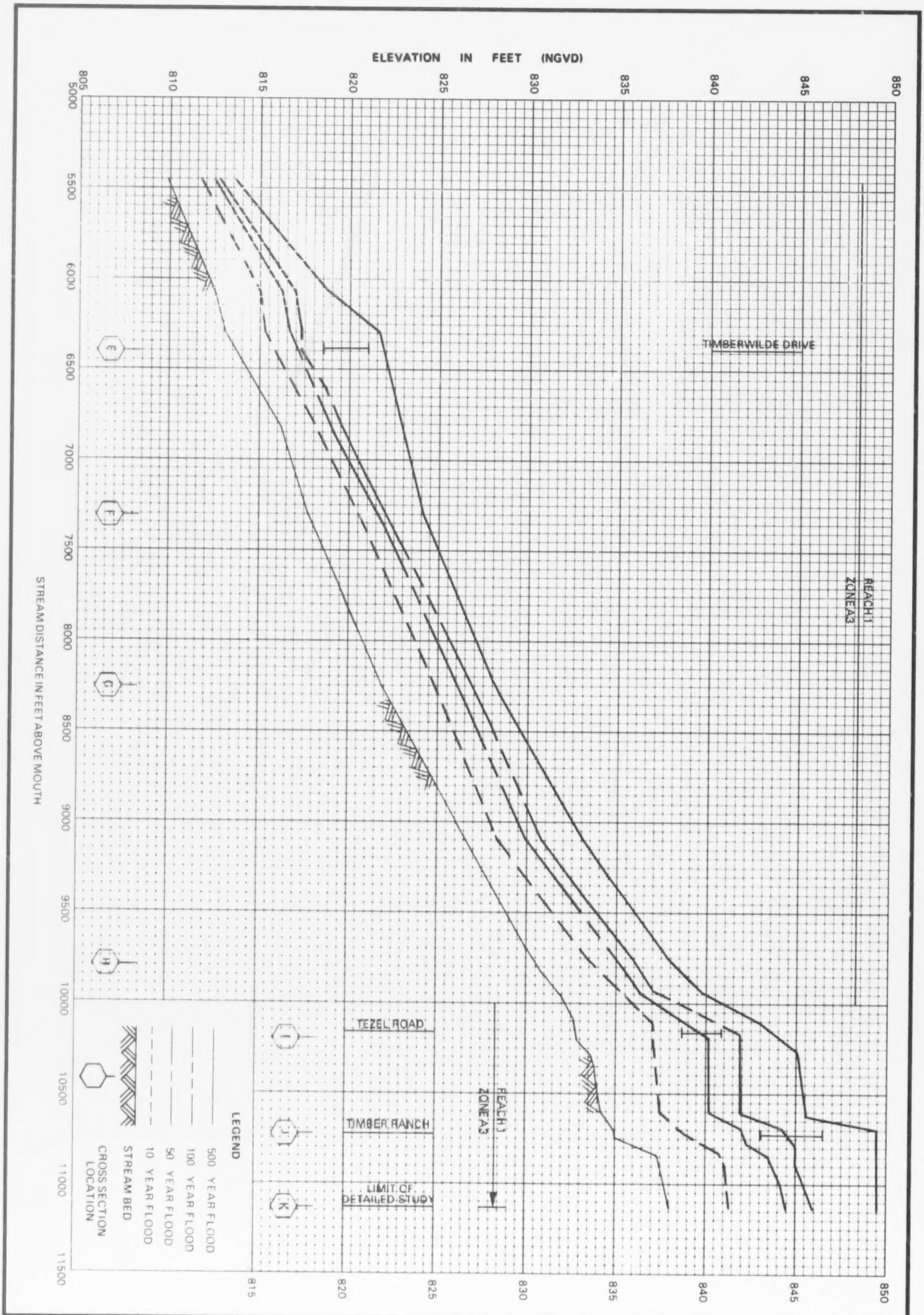
FLOOD PROFILES

TRIBUTARY A OF CULEBRA CREEK

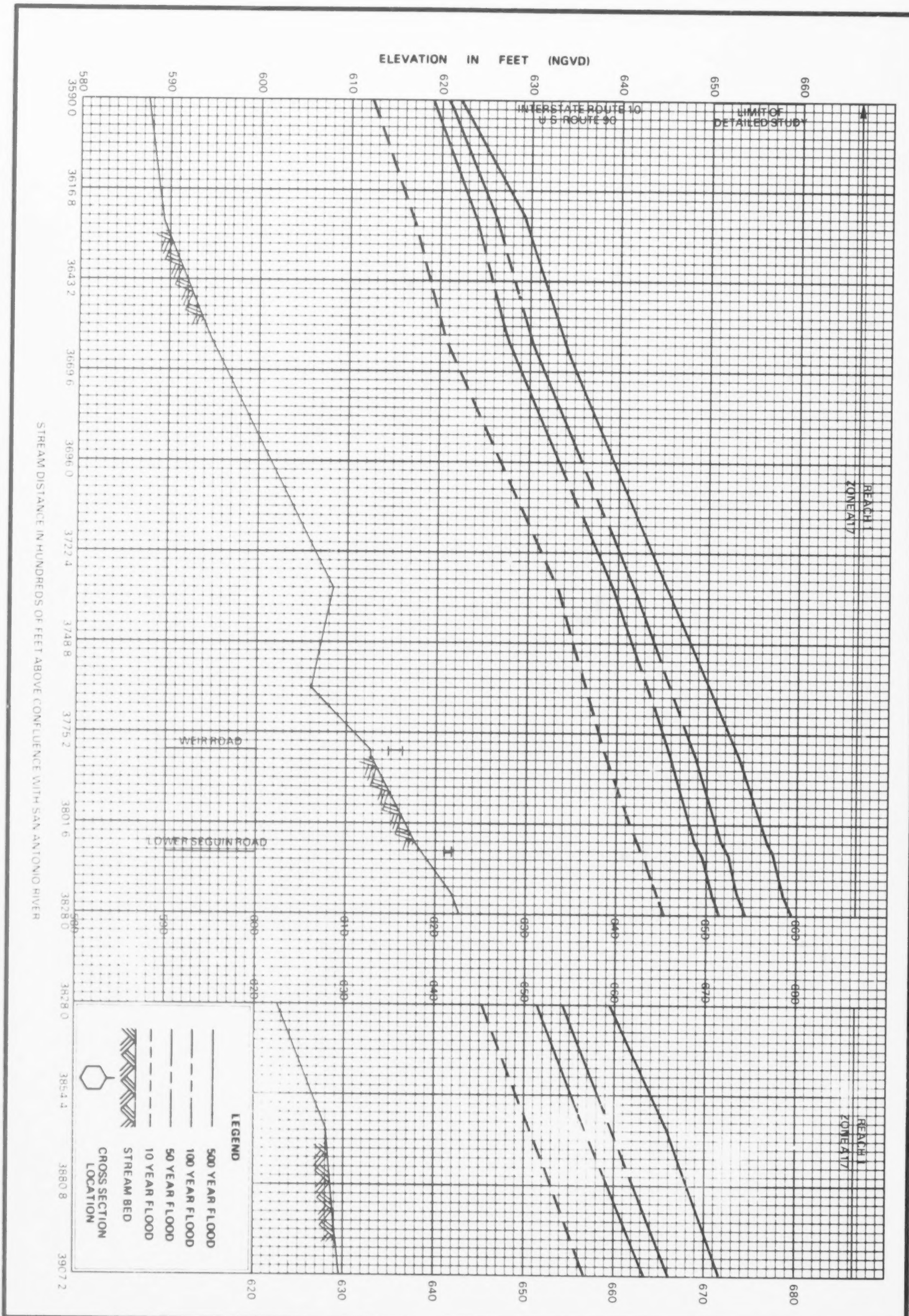
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

47P



48P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BEXAR COUNTY, TX** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **TRIBUTARY A OF CULEBRA CREEK**



FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD PROFILES

CIBOLO CREEK

49P

REACH 1
ZONE A17

SCHAEFER ROAD

REACH 1
ZONE A17

CITY OF SCHERTZ
AREA NOT INCLUDED

REACH 1
ZONE A17

CORPORATE LIMITS

LOWWATER CROSSING

CORPORATE LIMITS

ELEVATION IN FEET (NGVD)

700
690
680
670
660
650
640
630
620

720
710
700
690
680
670
660
650
640
630
620

3907.2
3933.6
3960.0
3986.4
4012.8
4039.2
4065.6
4092.0
4092.0
4118.4
4144.8
4197.6
4224.0

STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH SAN ANTONIO RIVER

LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

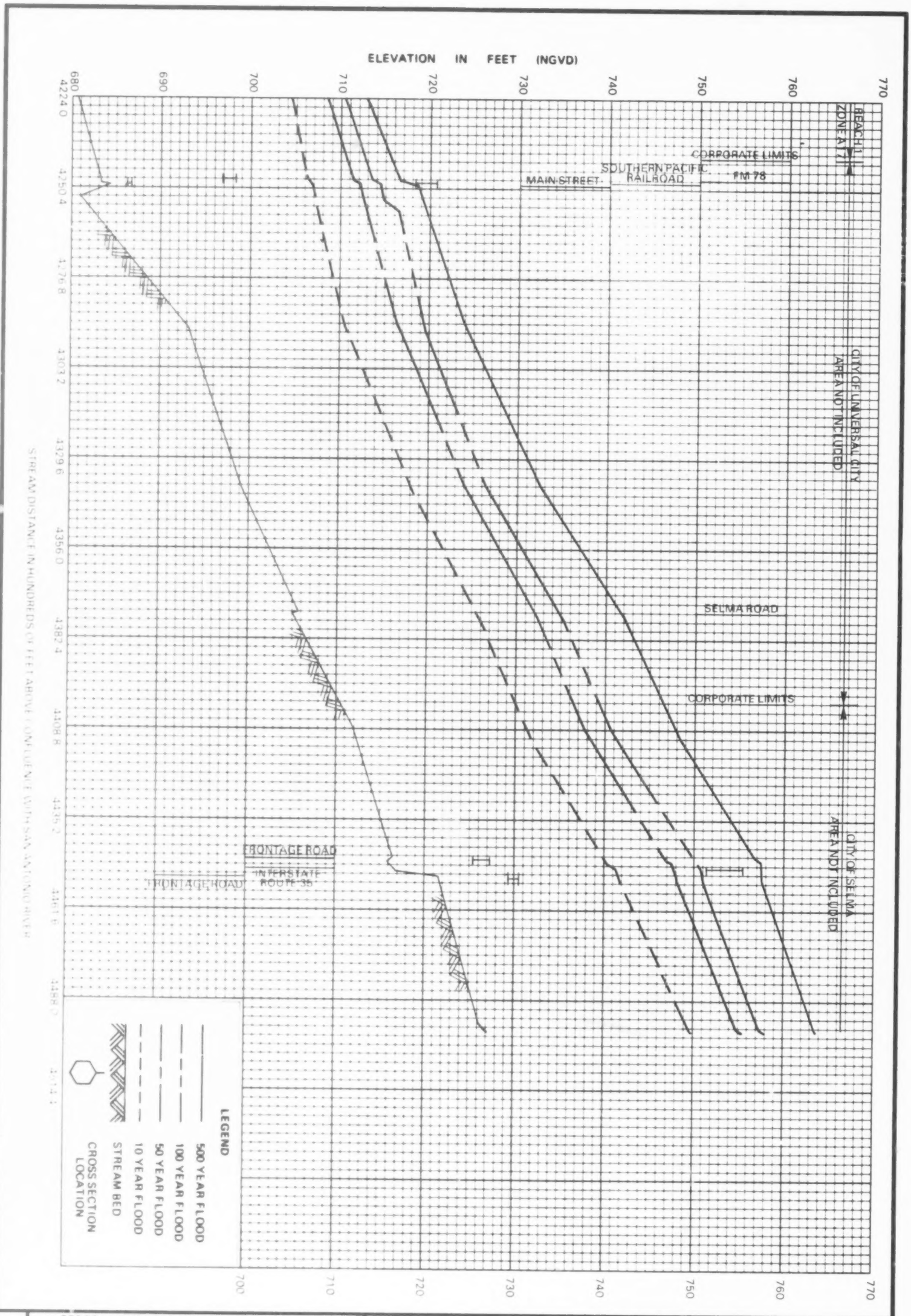
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

50P



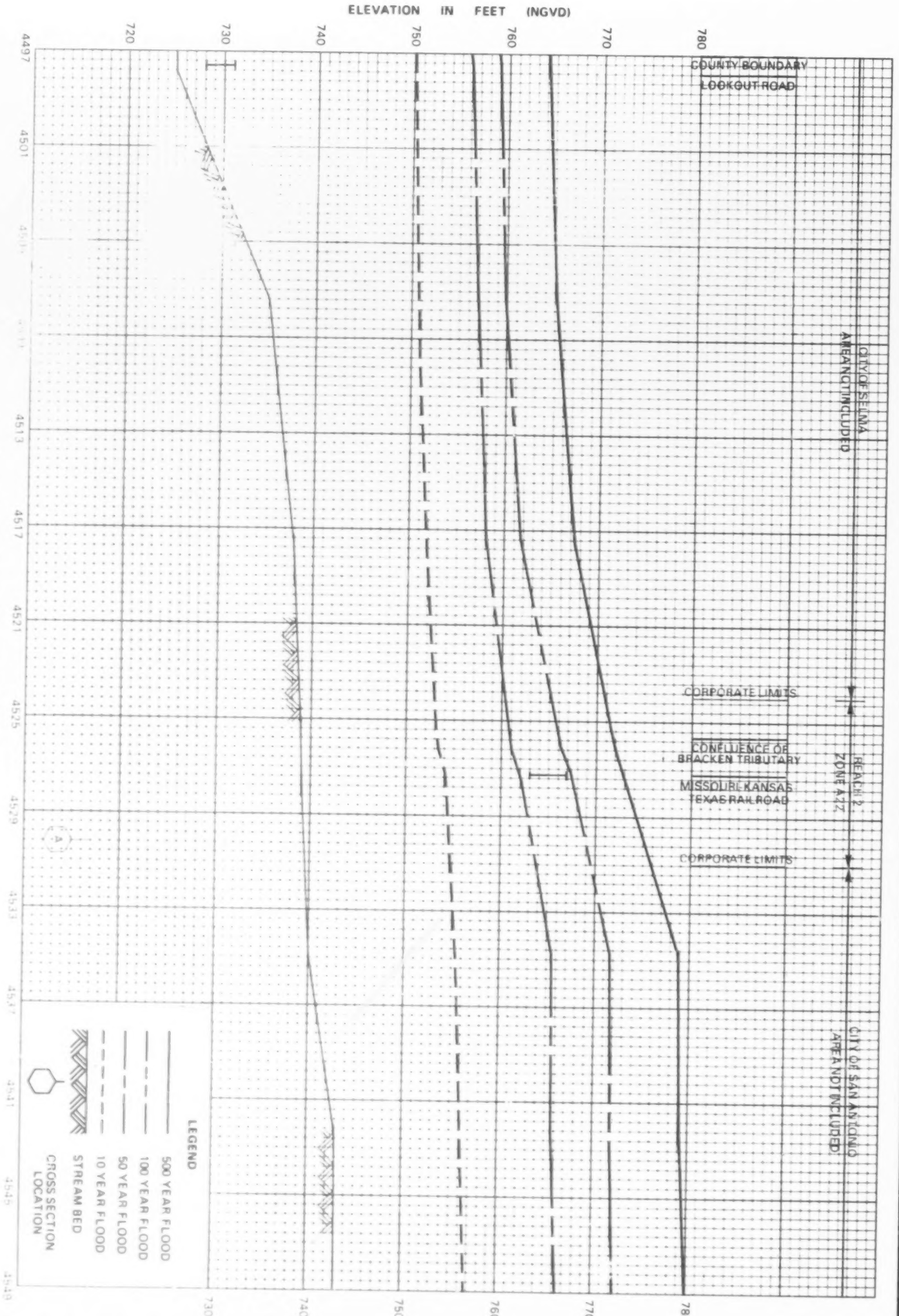
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD PROFILES

CIBOLO CREEK

51P



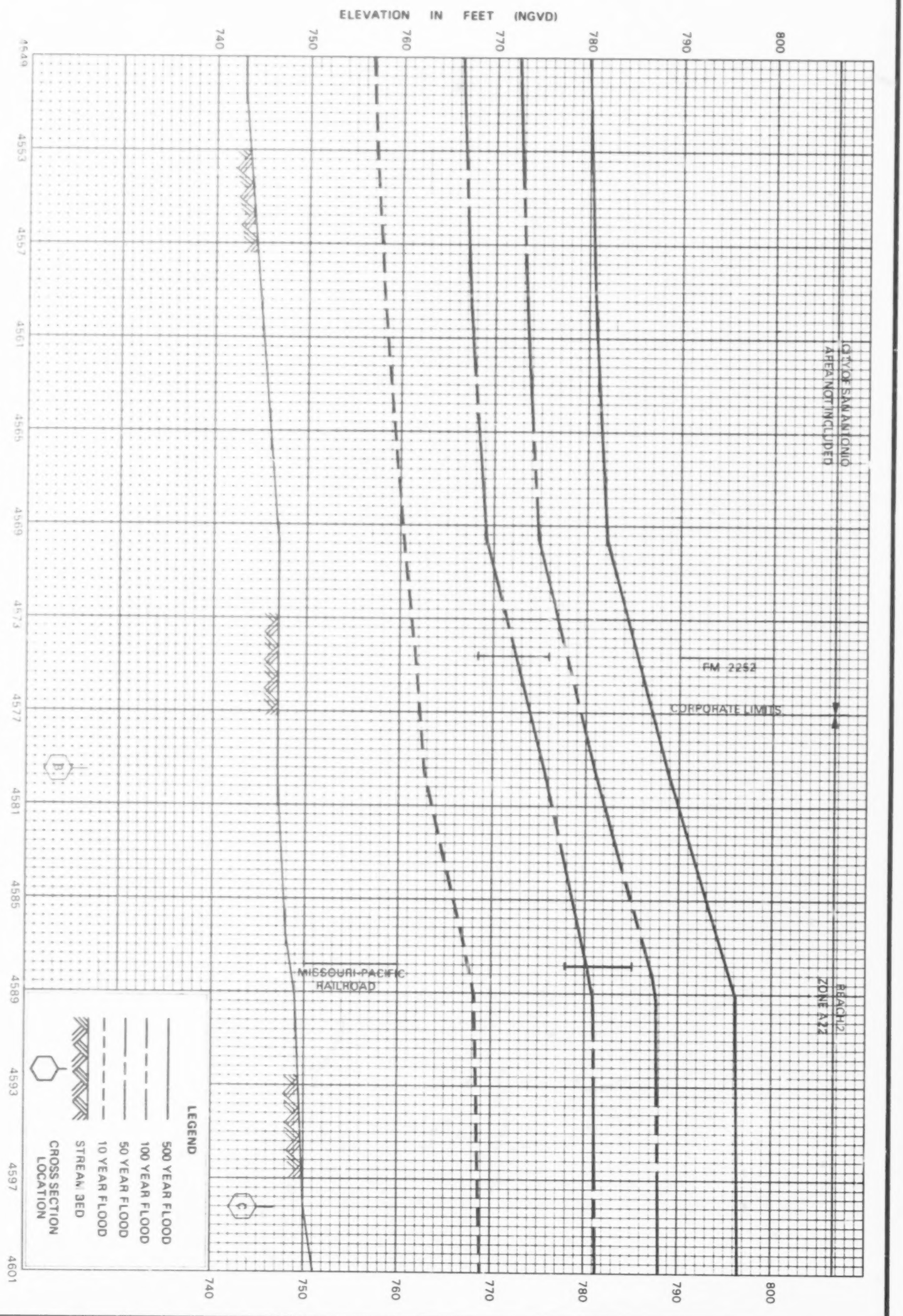
52P

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD PROFILES

CIBOLO CREEK



53P	FEDERAL EMERGENCY MANAGEMENT AGENCY BEXAR COUNTY, TX (UNINCORPORATED AREAS)	FLOOD PROFILES CIBOLO CREEK

REACH 2
ZONE A22

ELEVATION IN FEET (NGVD)

810
800
790
780
770
760
750

4601 4605 4609 4613 4617 4621 4625 4629 4633 4637 4641 4645 4649 4653

STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH SAN ANTONIO RIVER

D

E

LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

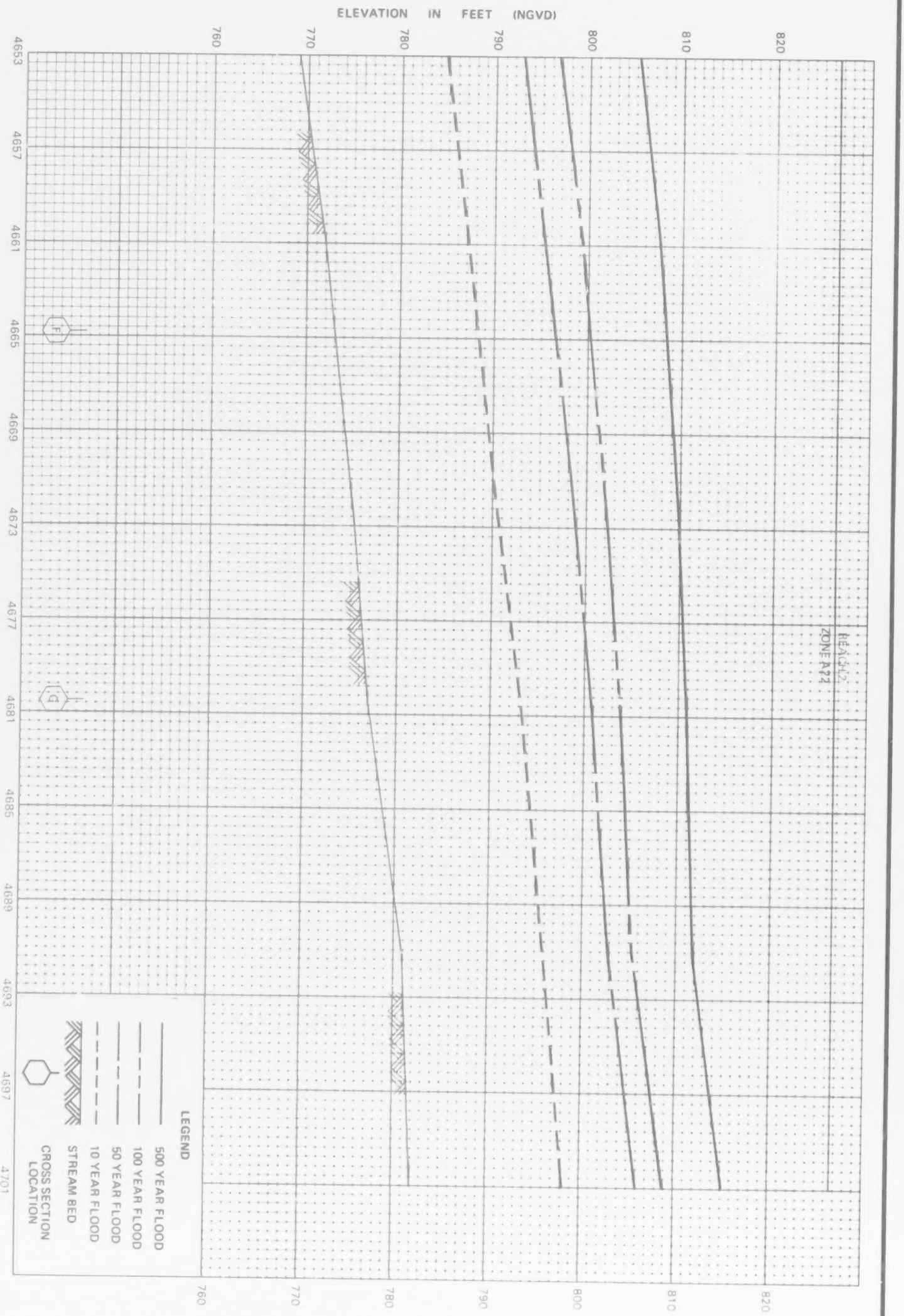
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

54P



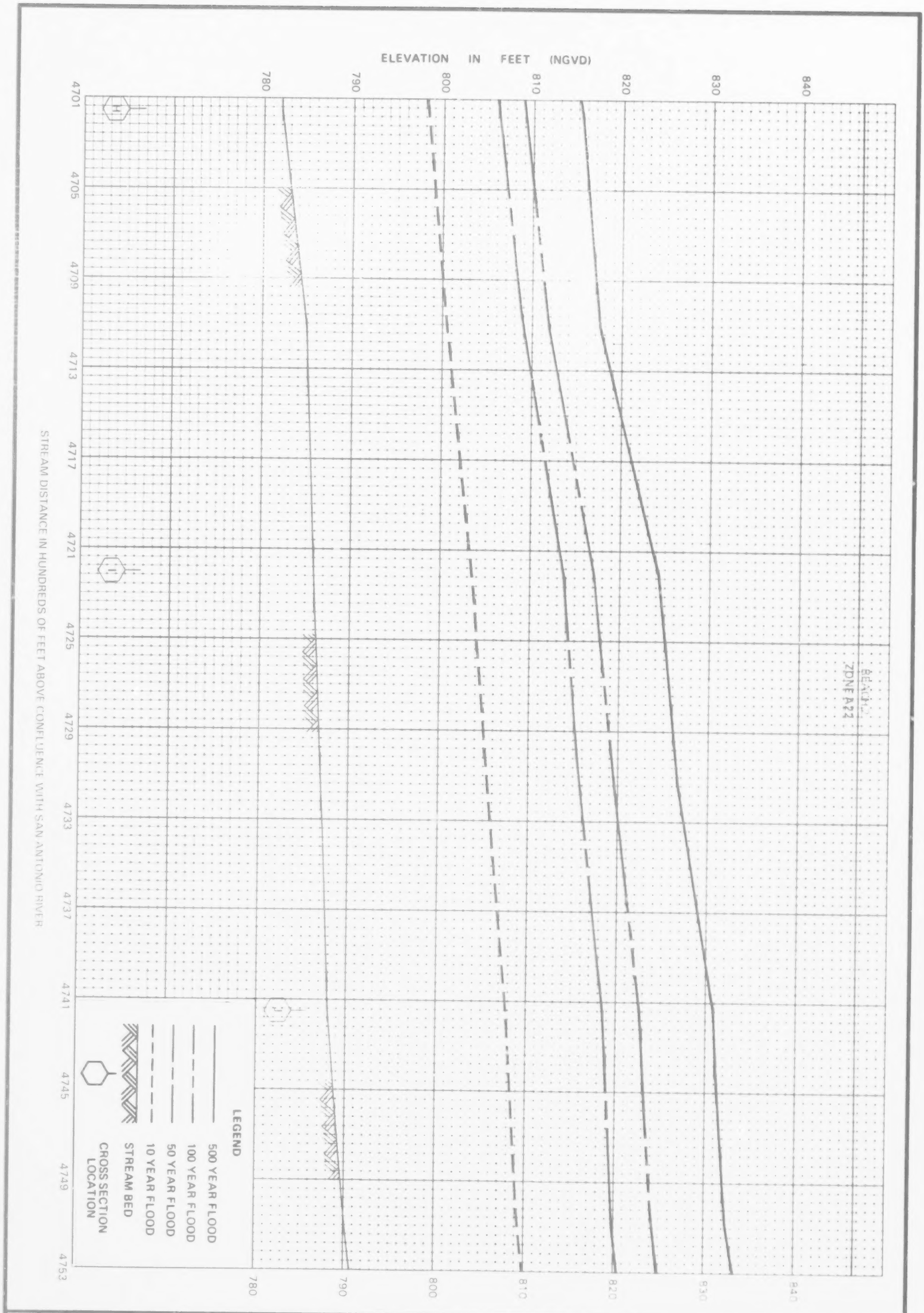
55P

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD PROFILES

CIBOLO CREEK



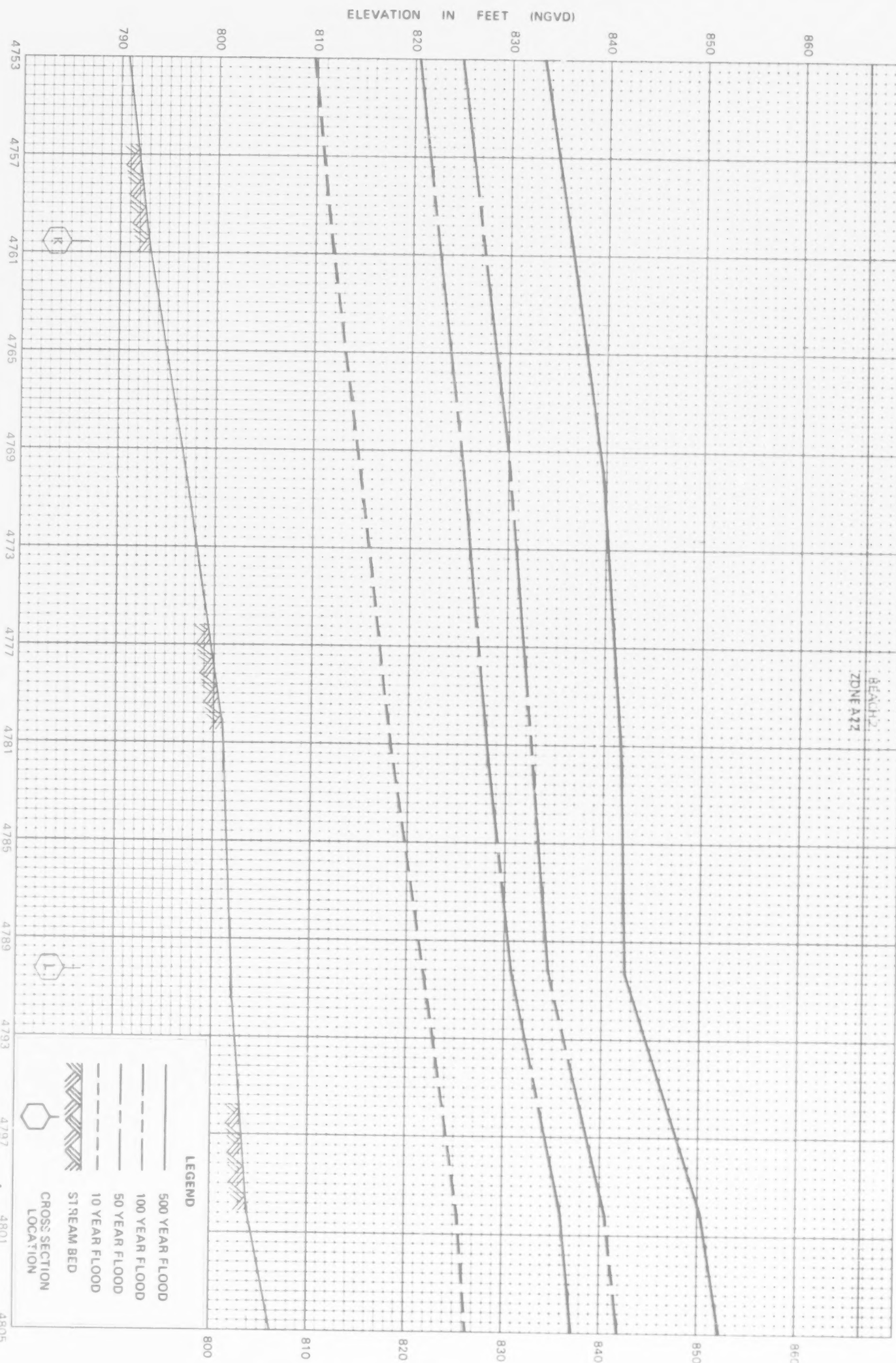
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD PROFILES

CIBOLO CREEK

56P



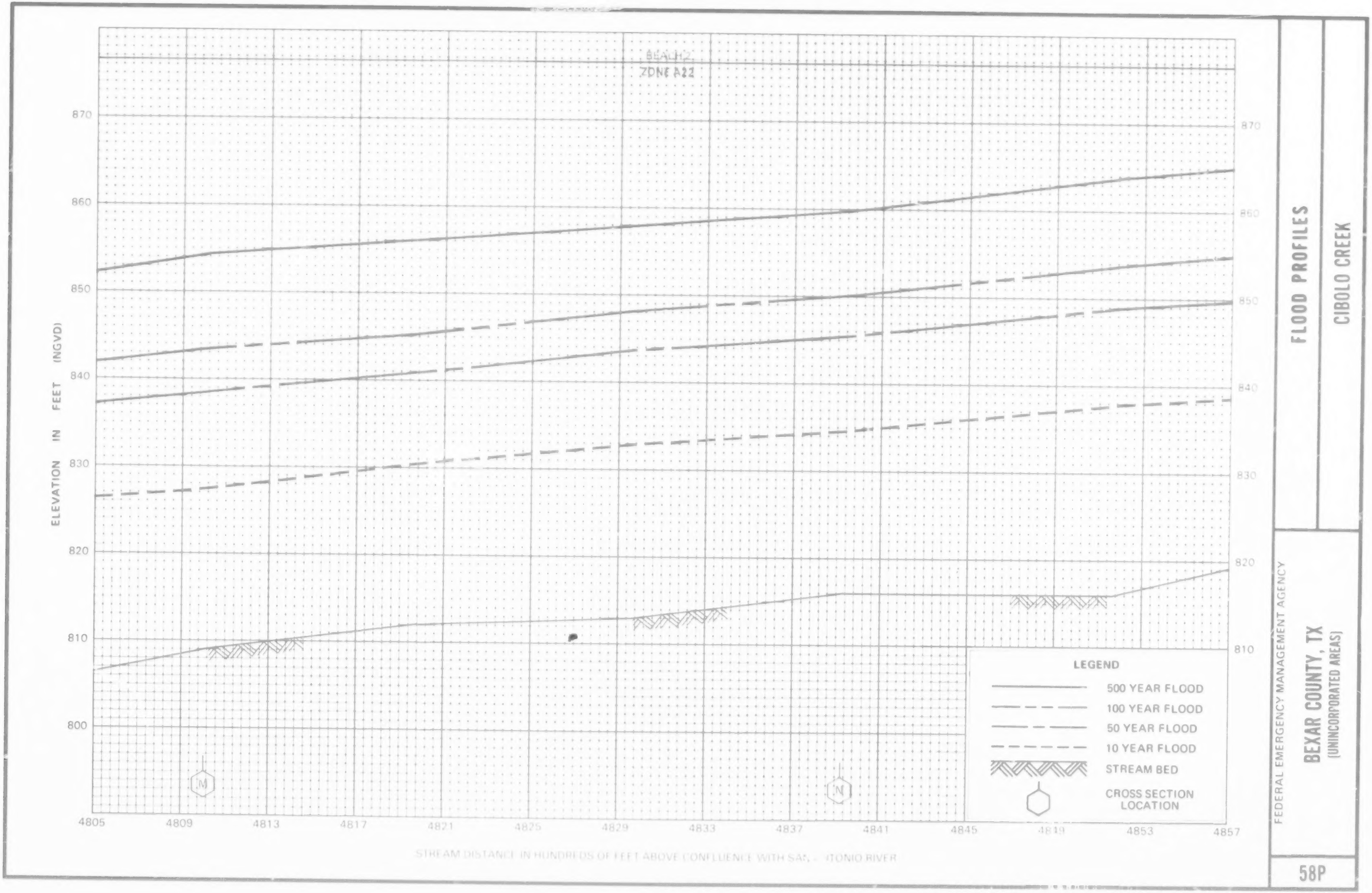
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD PROFILES

CIBOLO CREEK

57P



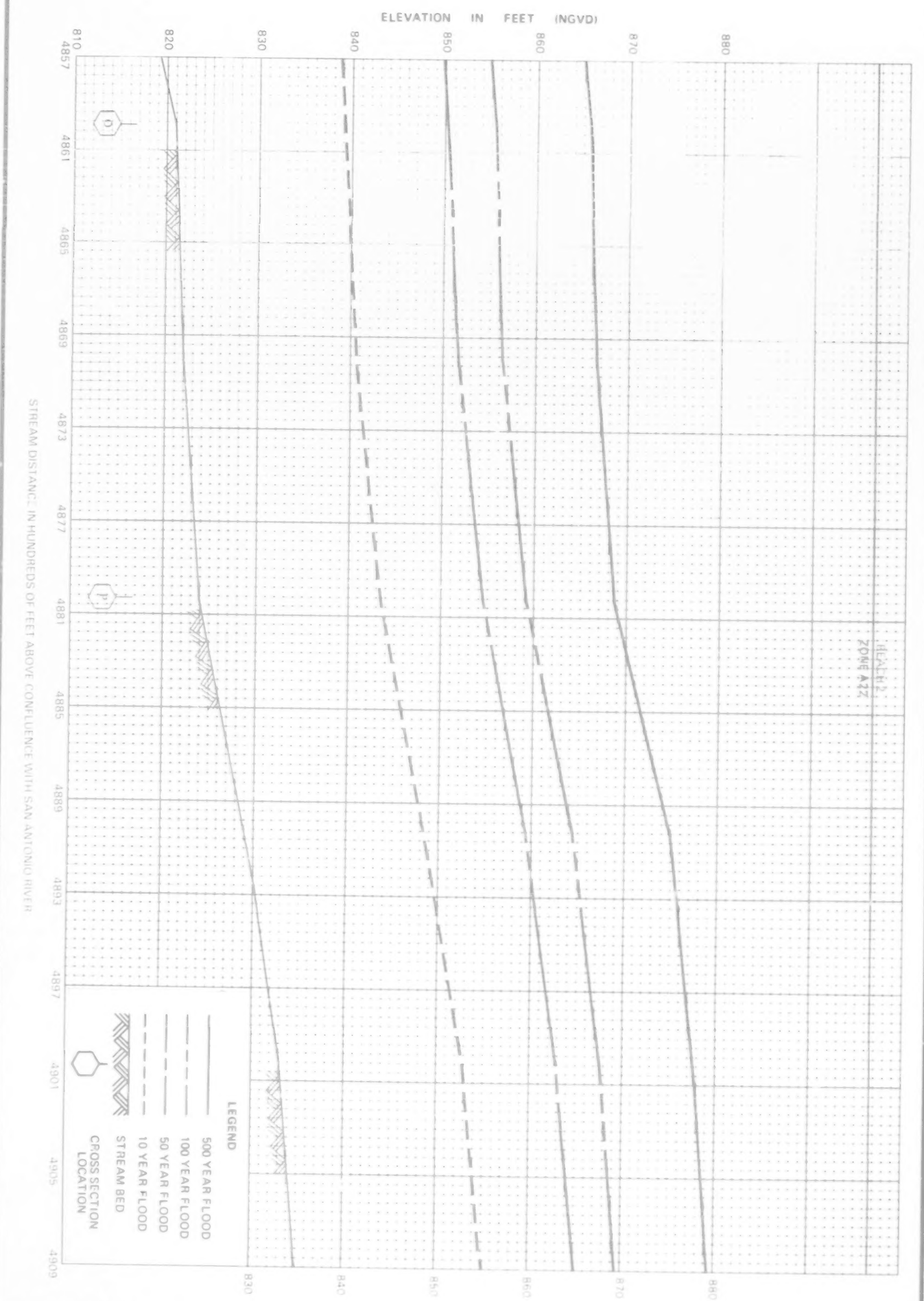
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

58P



106

59P

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD PROFILES

CIBOLO CREEK

BEACH 2
ZONE A22

ELEVATION IN FEET (NGVD)

900
890
880
870
860
850
840
830

4909 4913 4917 4921 4925 4929 4933 4937 4941 4945 4949 4953 4957 4961

STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH SAN ANTONIO RIVER

P
R
S

LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

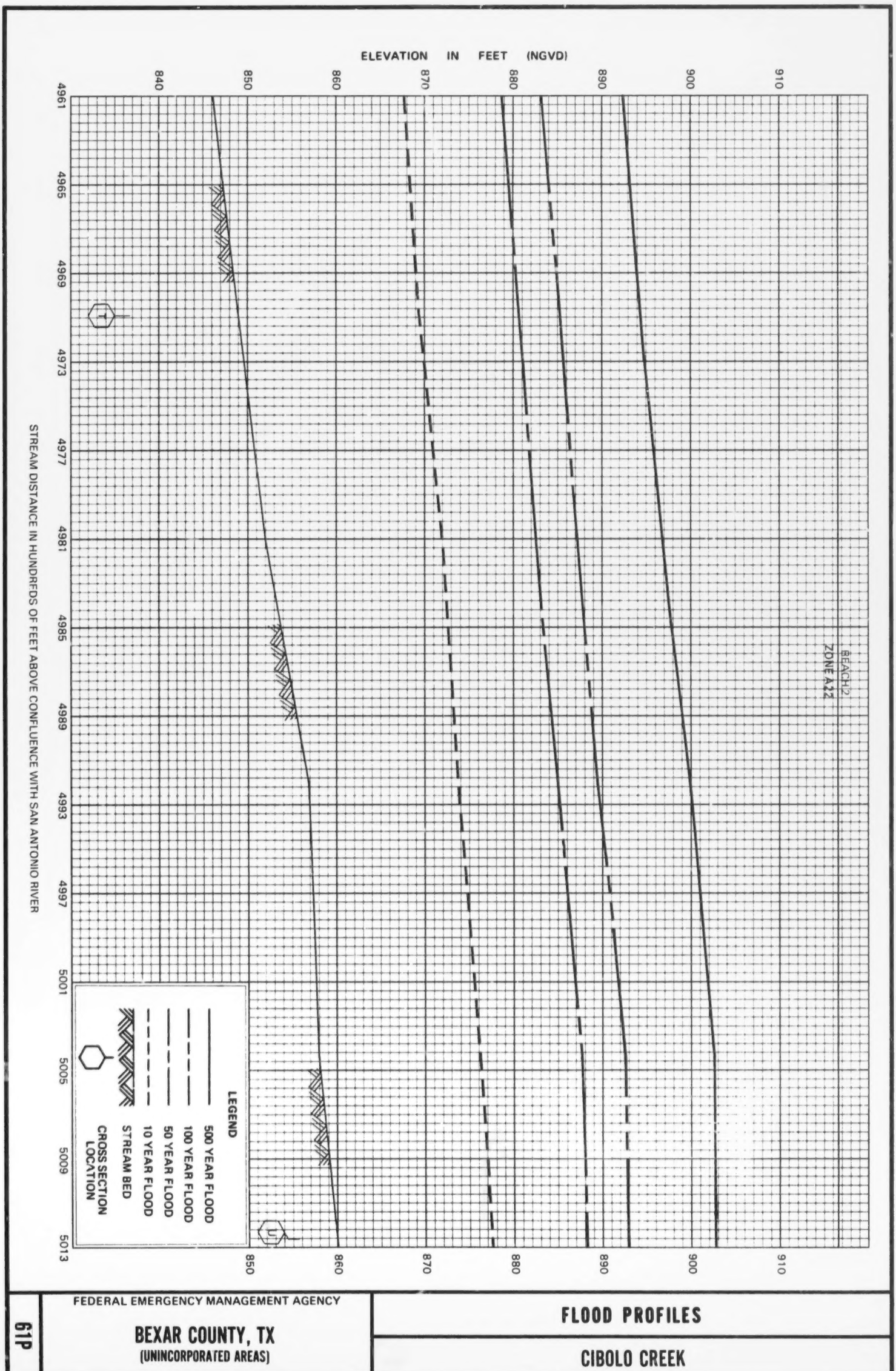
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

60P



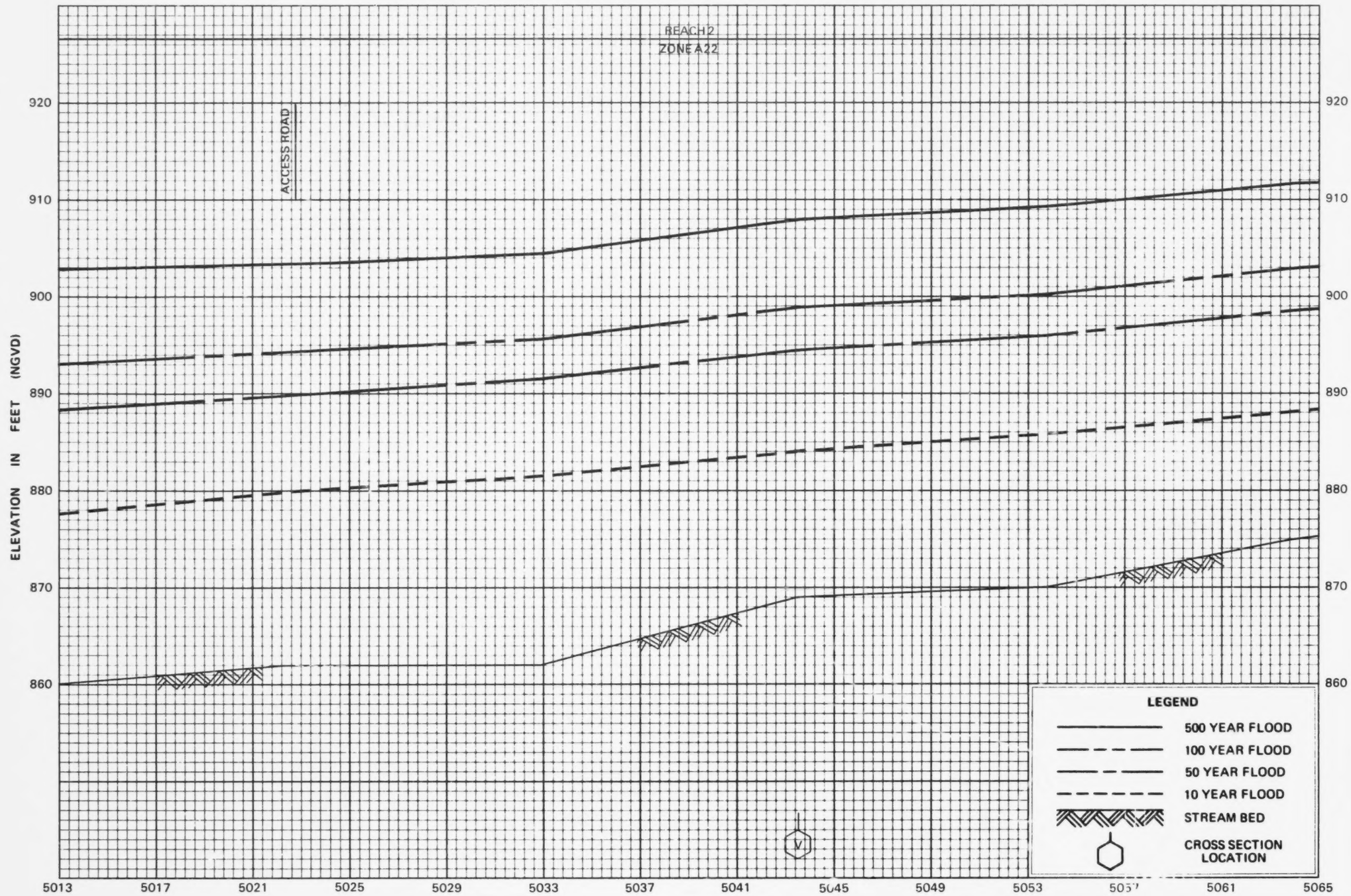
FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD PROFILES

CIBOLO CREEK

61P



FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

62P

BEACH 2
ZONE A22

ELEVATION IN FEET (NGVD)

920
910
900
890
880
870

5065 5069 5073 5077 5081 5085 5089 5093 5097 5101 5105 5109 5113 5117

STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH SAN ANTONIO RIVER

W

X

LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

63P

REACH 2
ZONE A22

930
920
910
900
890
880

ELEVATION IN FEET (NGVD)

5117 5121 5125 5129 5133 5137 5141 5145 5149 5153 5157 5161 5165 5169

STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH SAN ANTONIO RIVER

Y

Z

LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

REACH 2
ZONE A22

950
940
930
920
910
900
890

ELEVATION IN FEET (NGVD)

AA
AB

5169 5173 5177 5181 5185 5189 5193 5197 5201 5205 5209 5213 5217 5221

STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH SAN ANTONIO RIVER

LEGEND
- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

65P

REACH 2
ZONE A22

ELEVATION IN FEET (NGVD)

960
950
940
930
920
910
900

5221 5225 5229 5233 5237 5241 5245 5249 5253 5257 5261 5265 5269 5273

STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH SAN ANTONIO RIVER

AC

LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

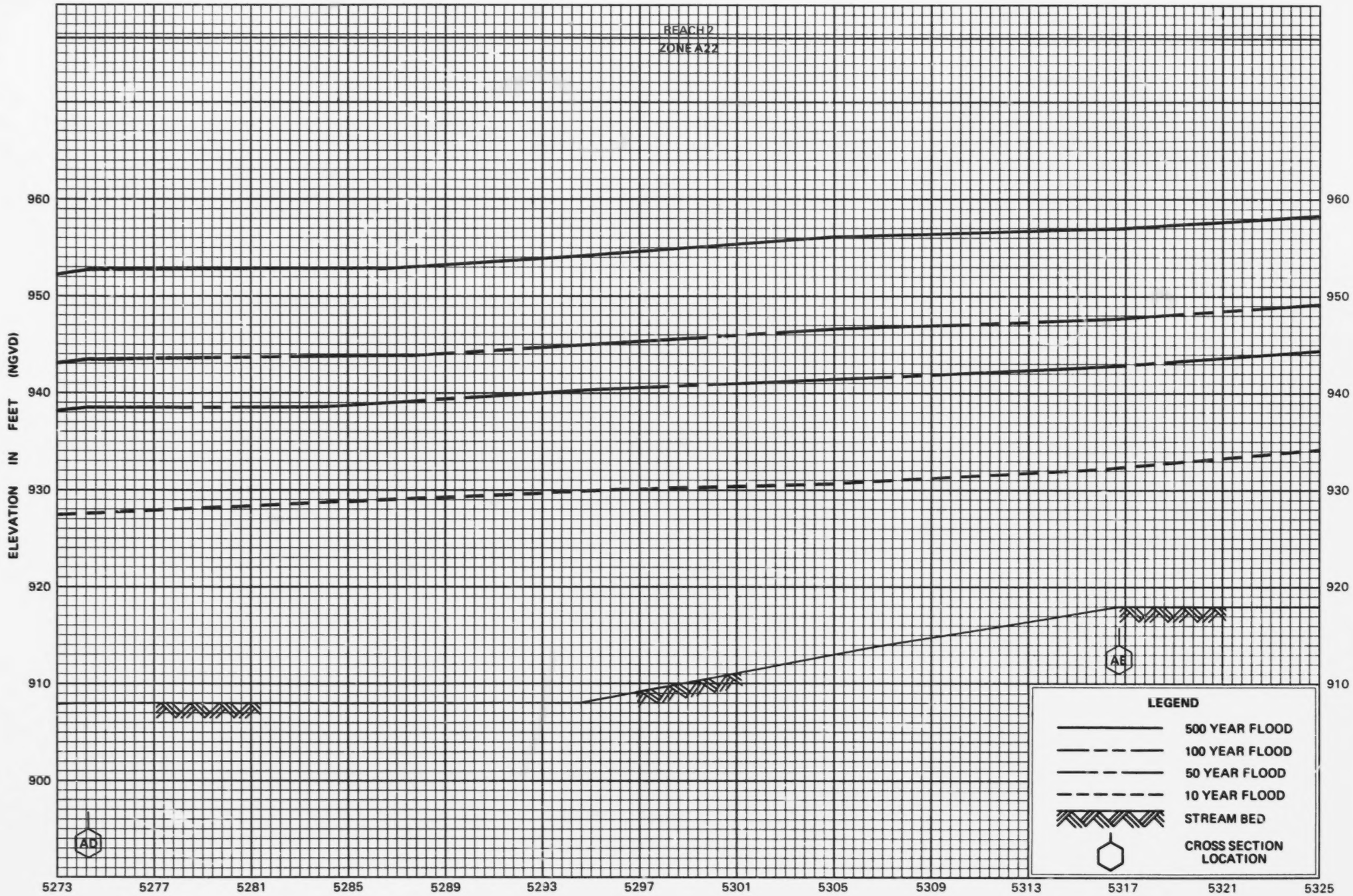
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

66P



FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

67P

REACH 2
ZONE A22

RM 1863

ELEVATION IN FEET (NGVD)

970
960
950
940
930
920
910

5325 5329 5333 5337 5341 5345 5349 5353 5357 5361 5365 5369 5373 5377

STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH SAN ANTONIO RIVER

AF

LEGEND
- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

68P

REACH 2
ZONE AZ2

FM 1863

ELEVATION IN FEET (NGVD)

980
970
960
950
940
930

AG
AH

5377 5381 5385 5389 5393 5397 5401 5405 5409 5413 5417 5421 5425 5429

STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH SAN ANTONIO RIVER

LEGEND
- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

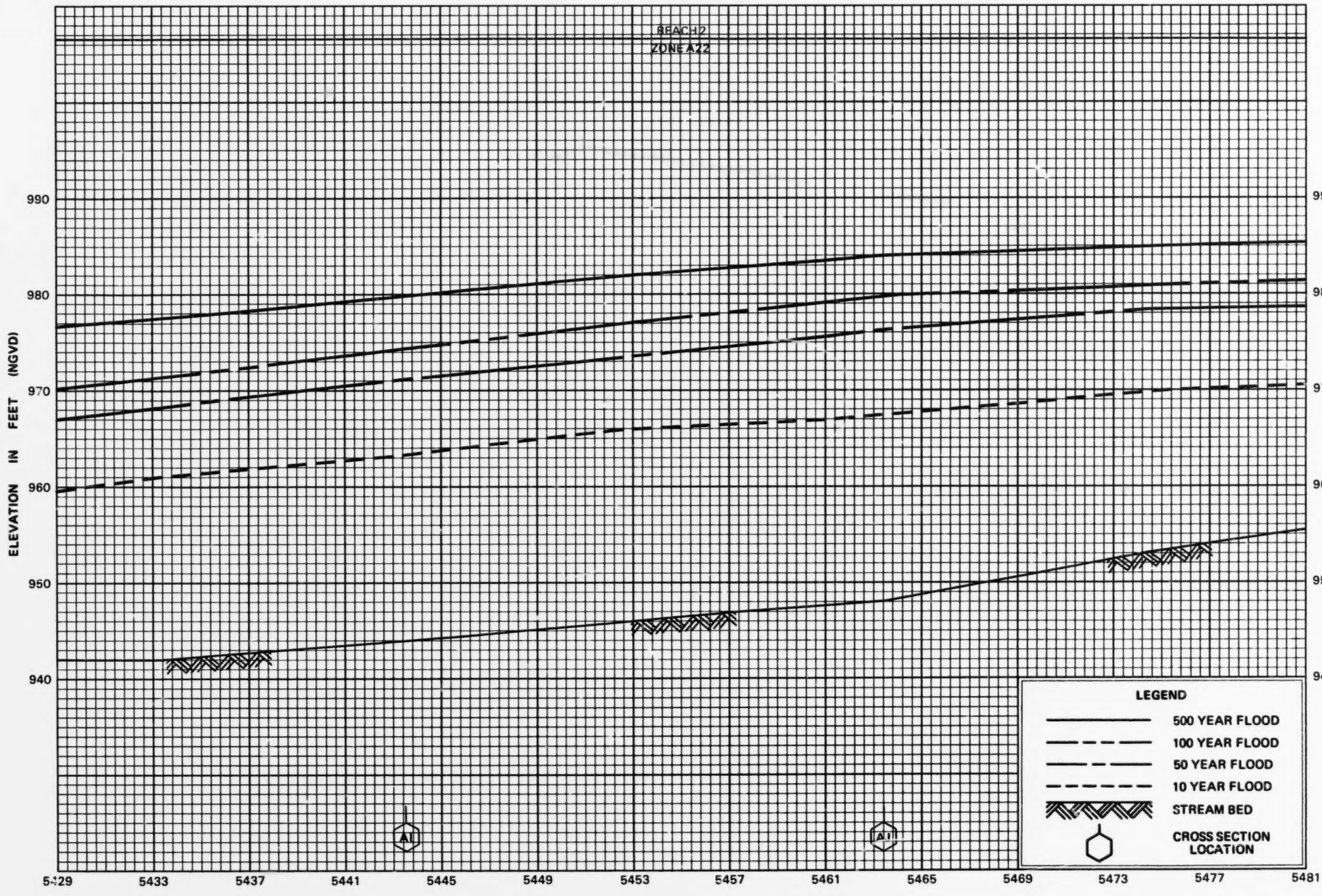
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

69P



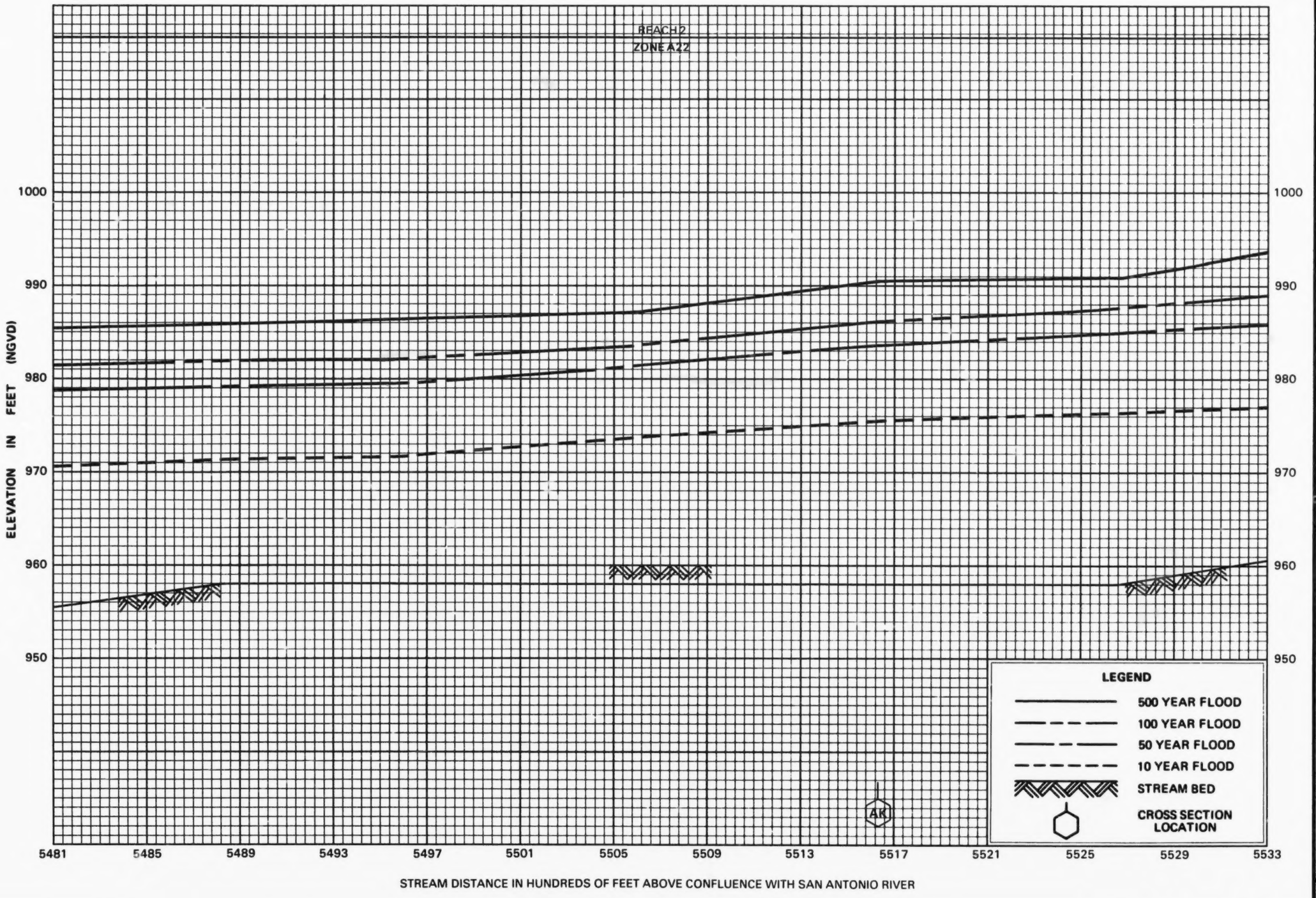
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

70P



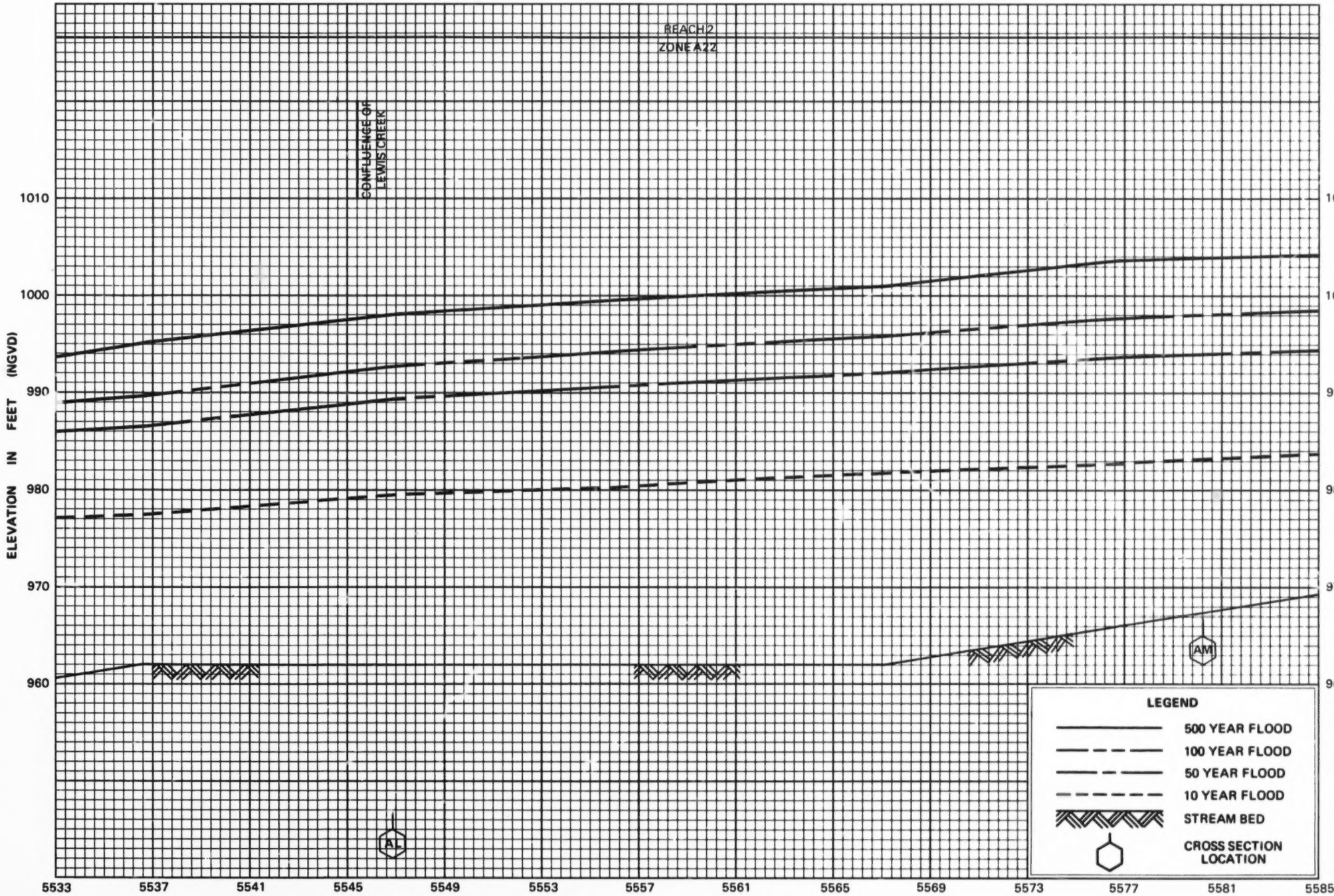
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

71P



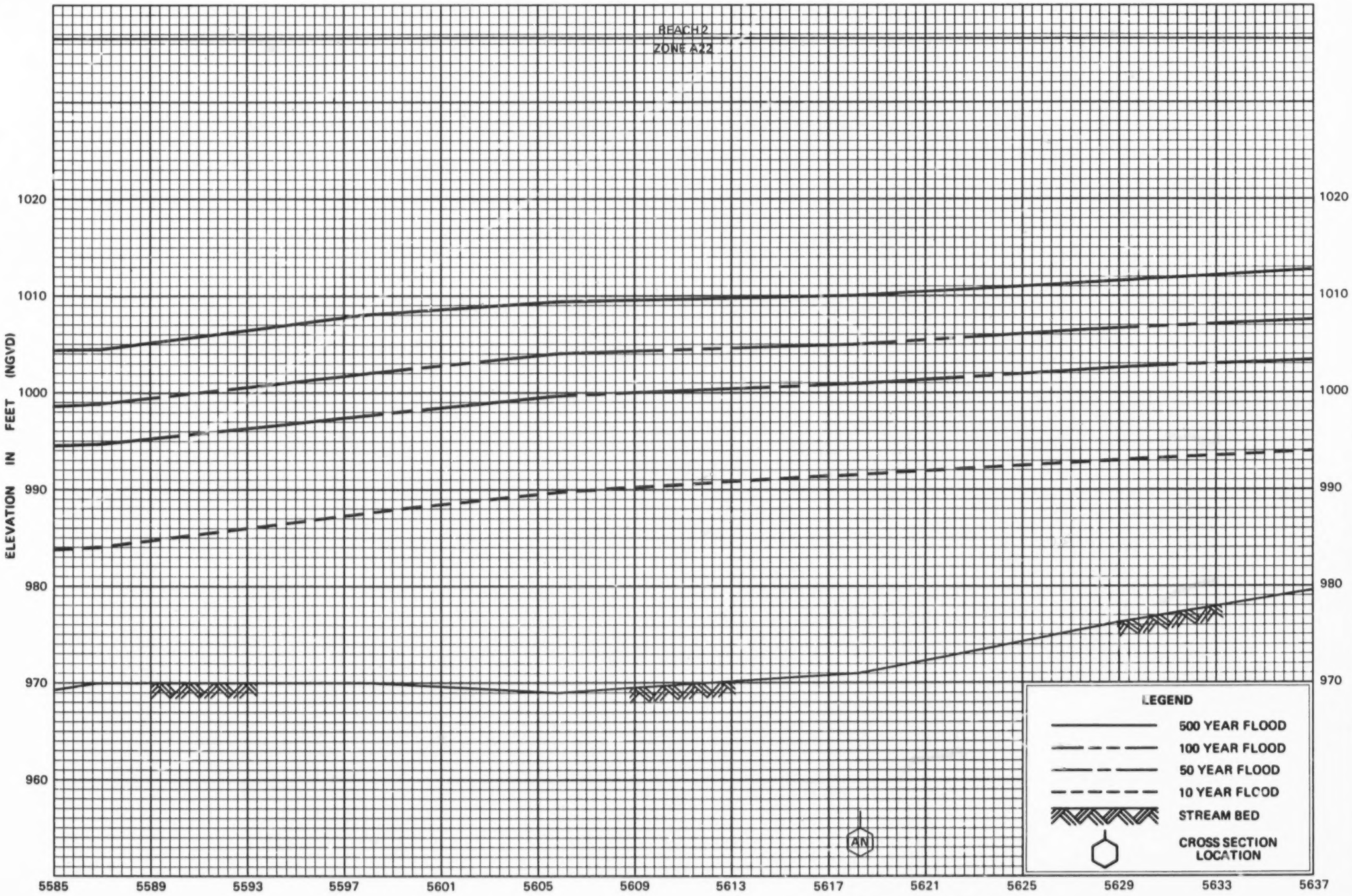
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

72P



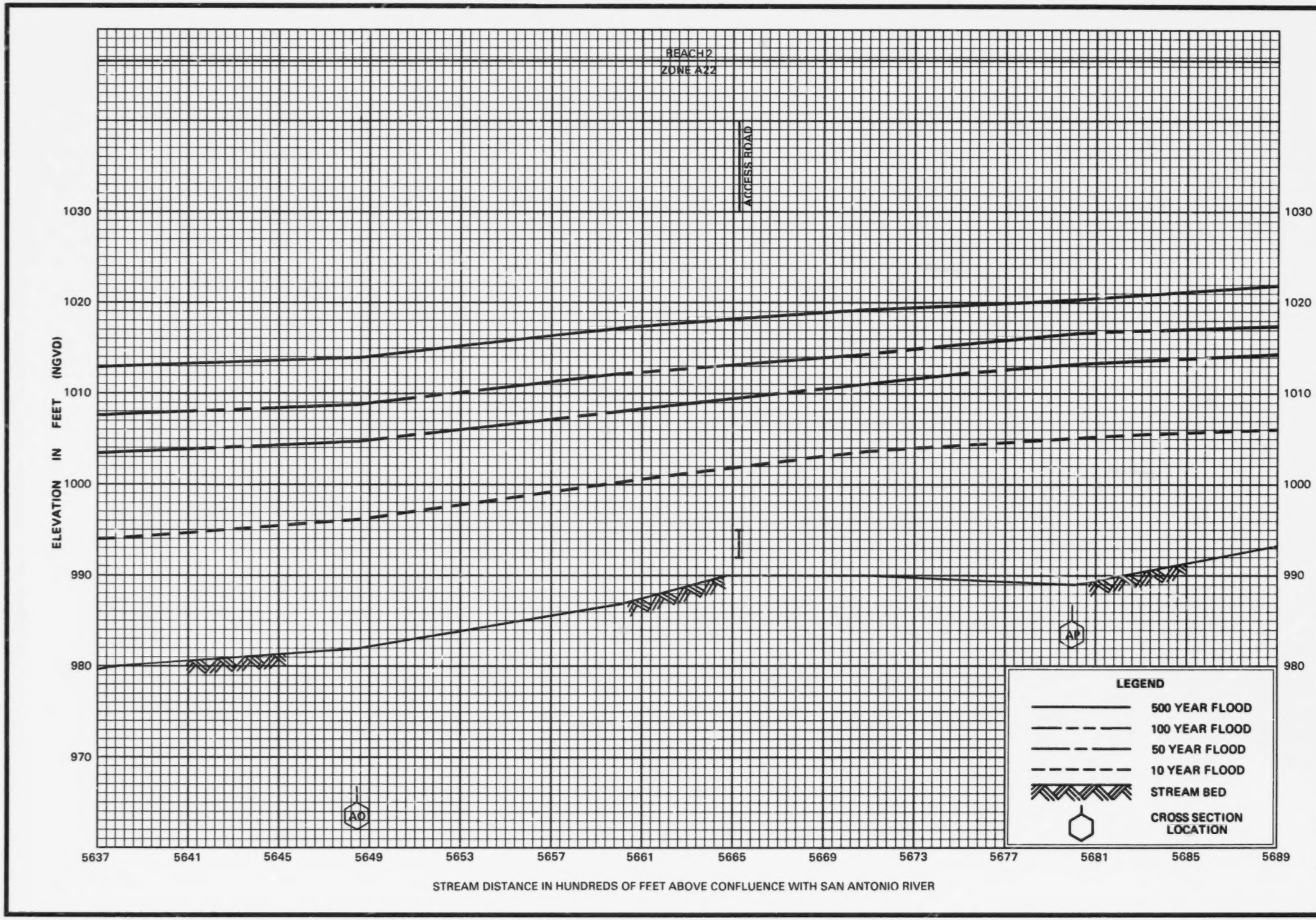
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

73P



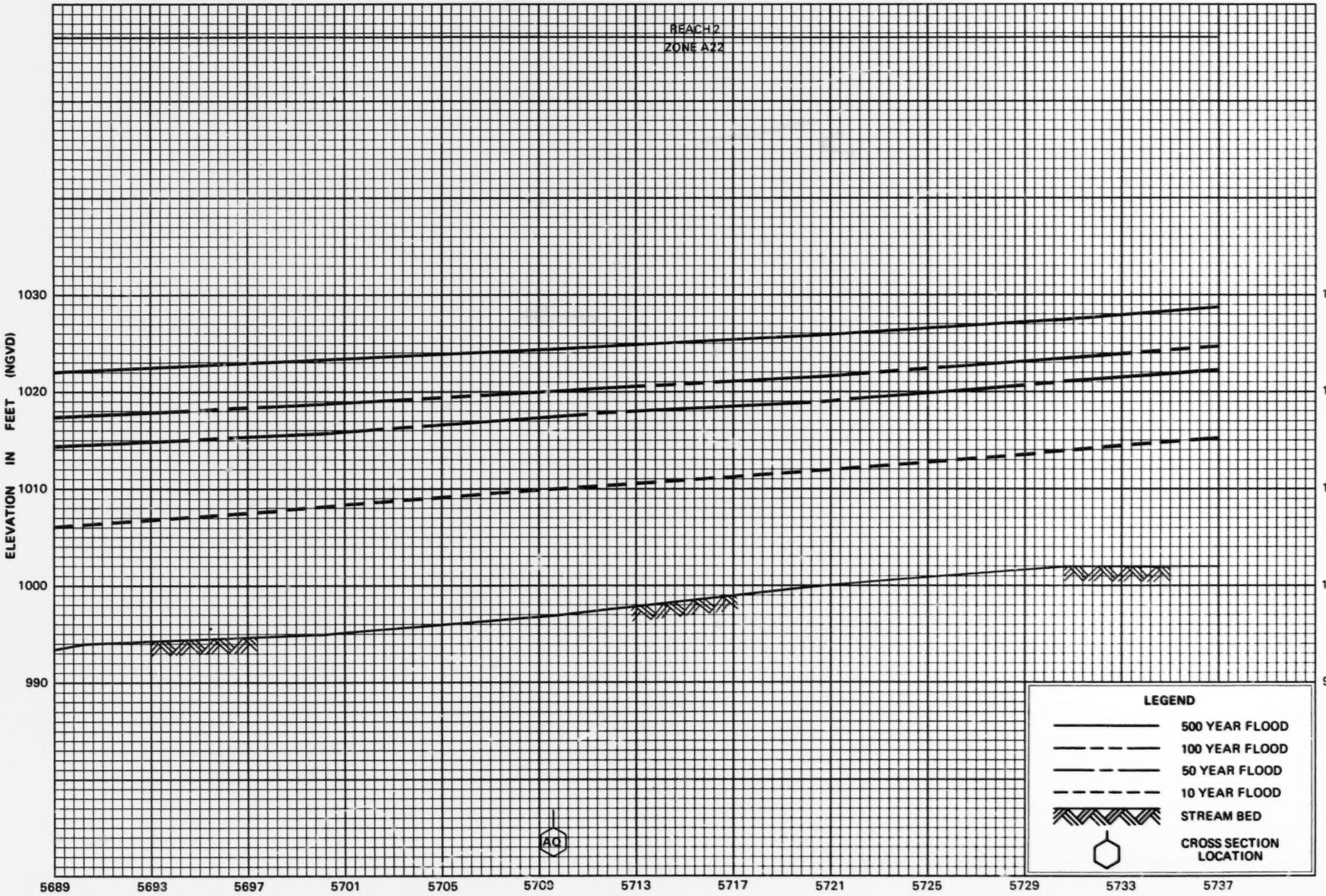
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

74P



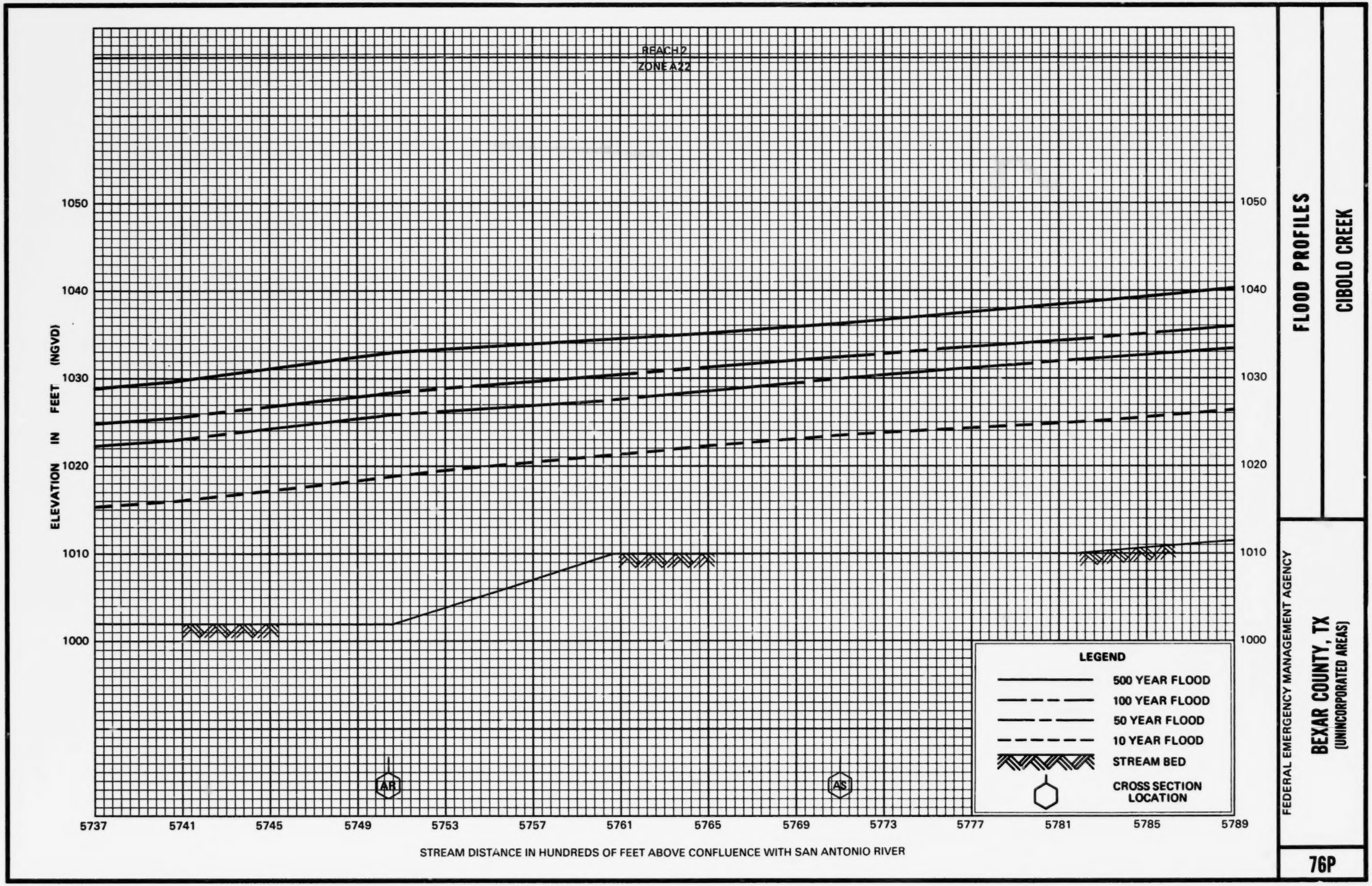
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

75P



FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

76P

REACH 2
ZONE A22

ELEVATION IN FEET (NGVD)

1050
1040
1030
1020
1010

5789 5793 5797 5801 5805 5809 5813 5817 5821 5825 5829 5833 5837 5841

STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH SAN ANTONIO RIVER

A1

LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

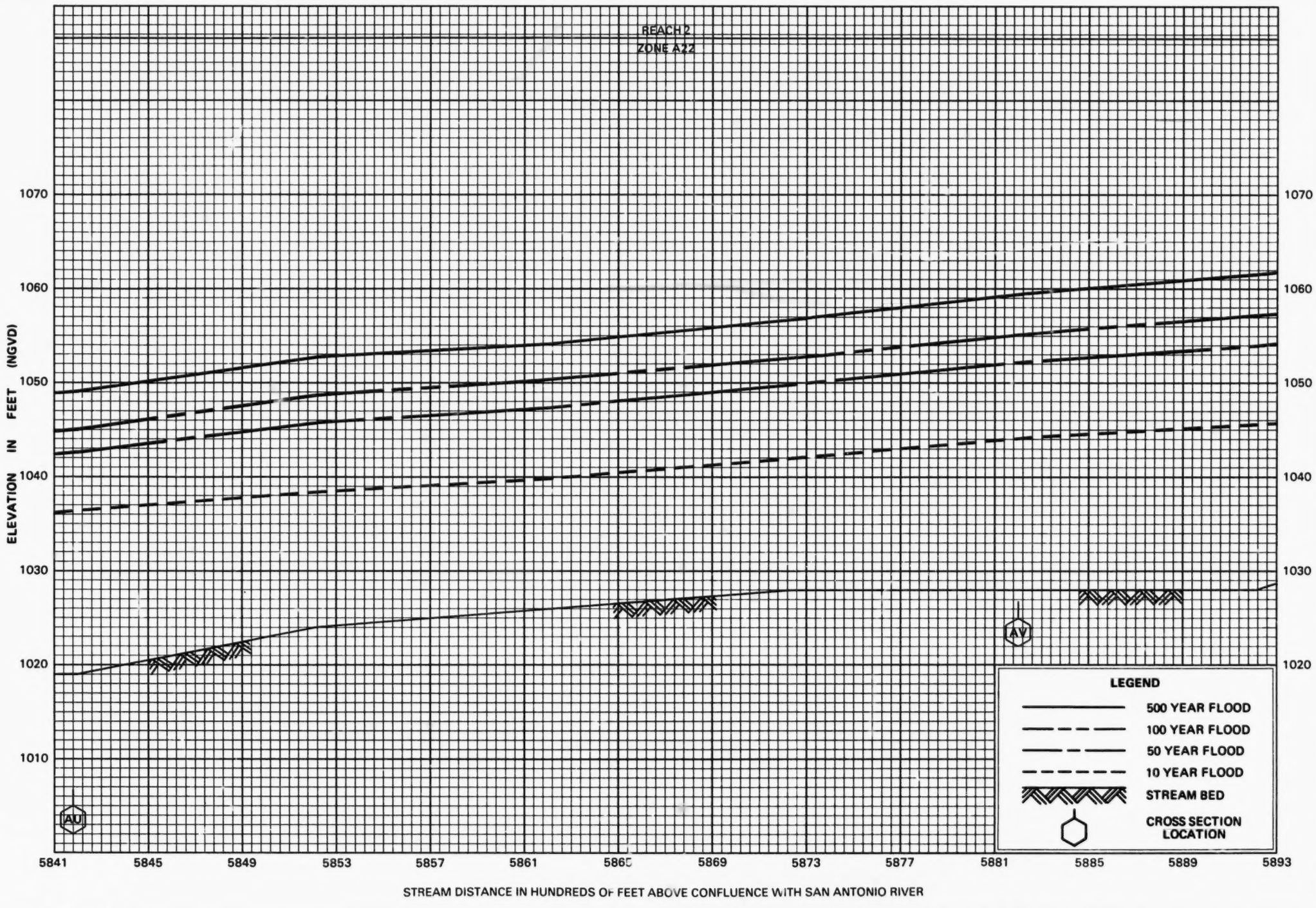
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

77P



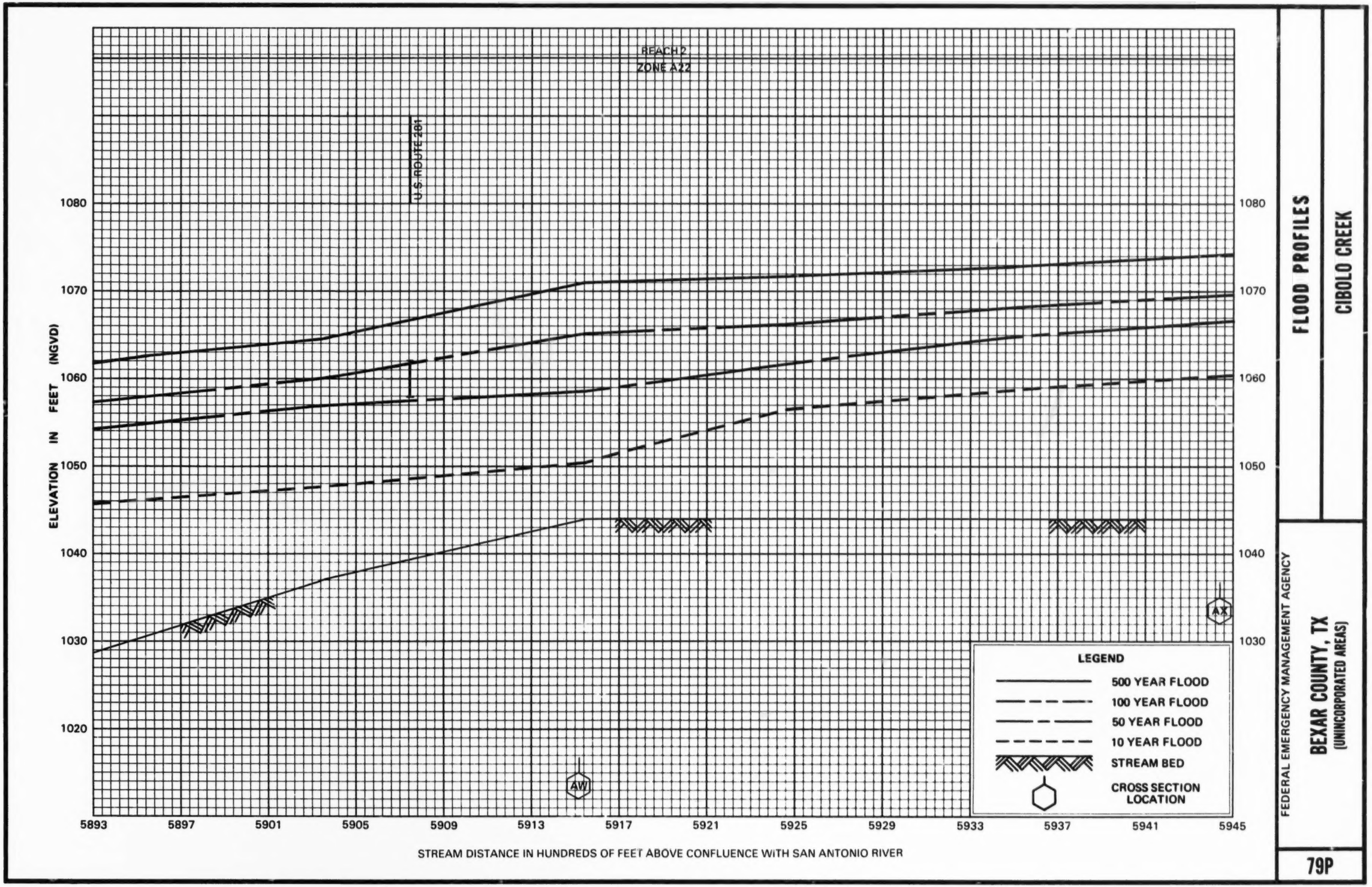
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

78P



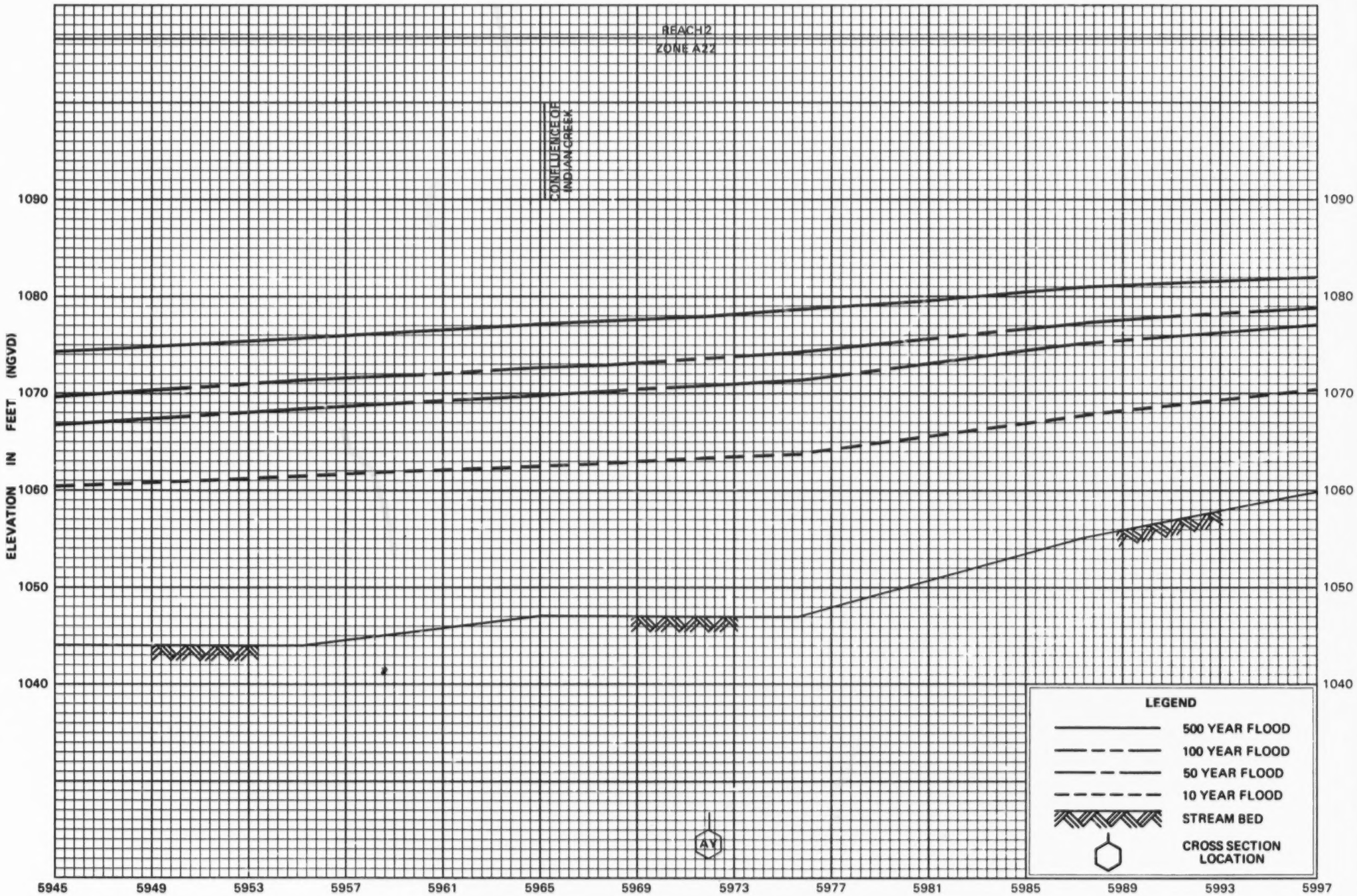
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

79P



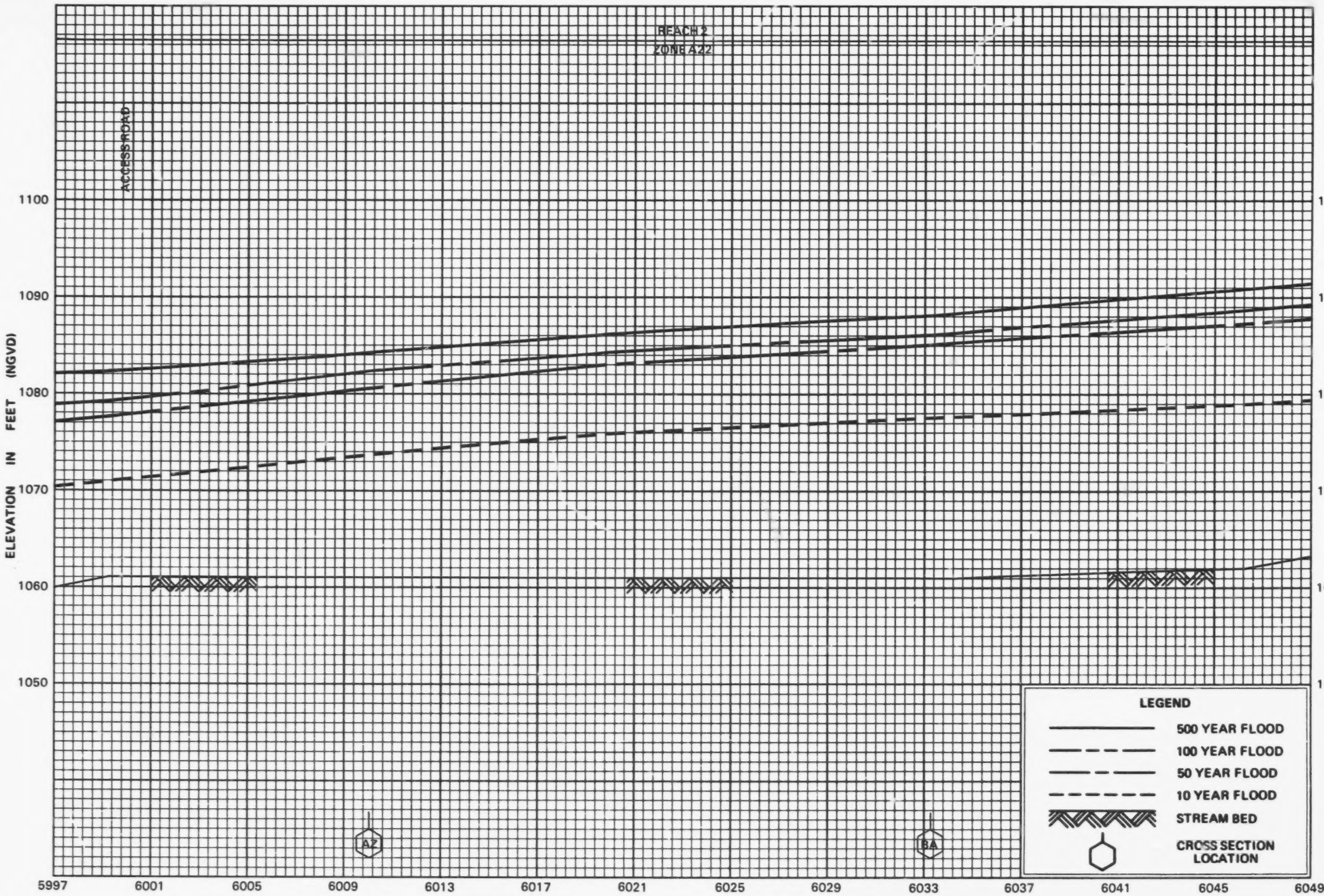
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

80P



K&E 10 1254 9-83 A1766

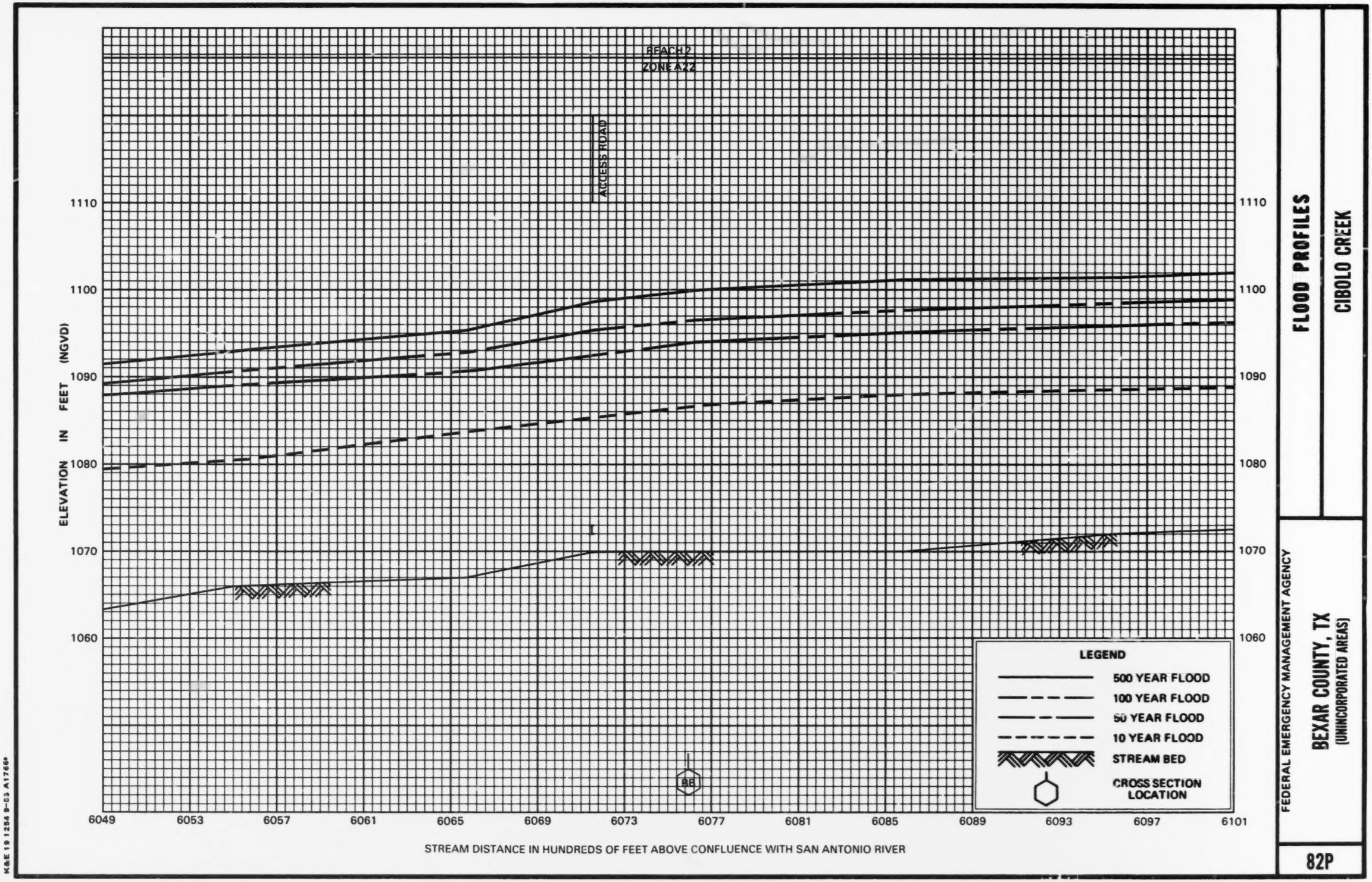
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

81P



FLOOD PROFILES

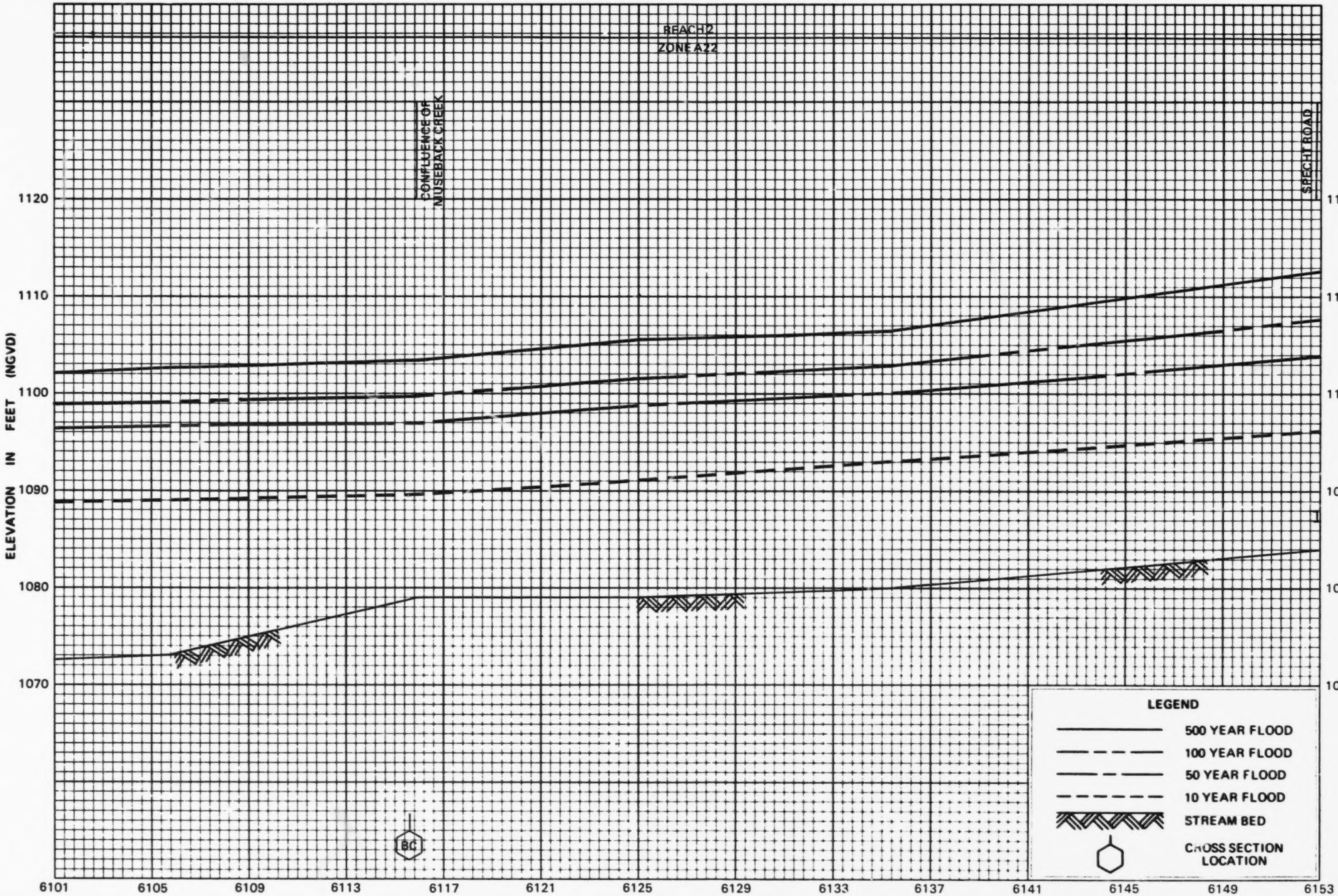
CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

82P

K&E 10 1284 9-83 A1766



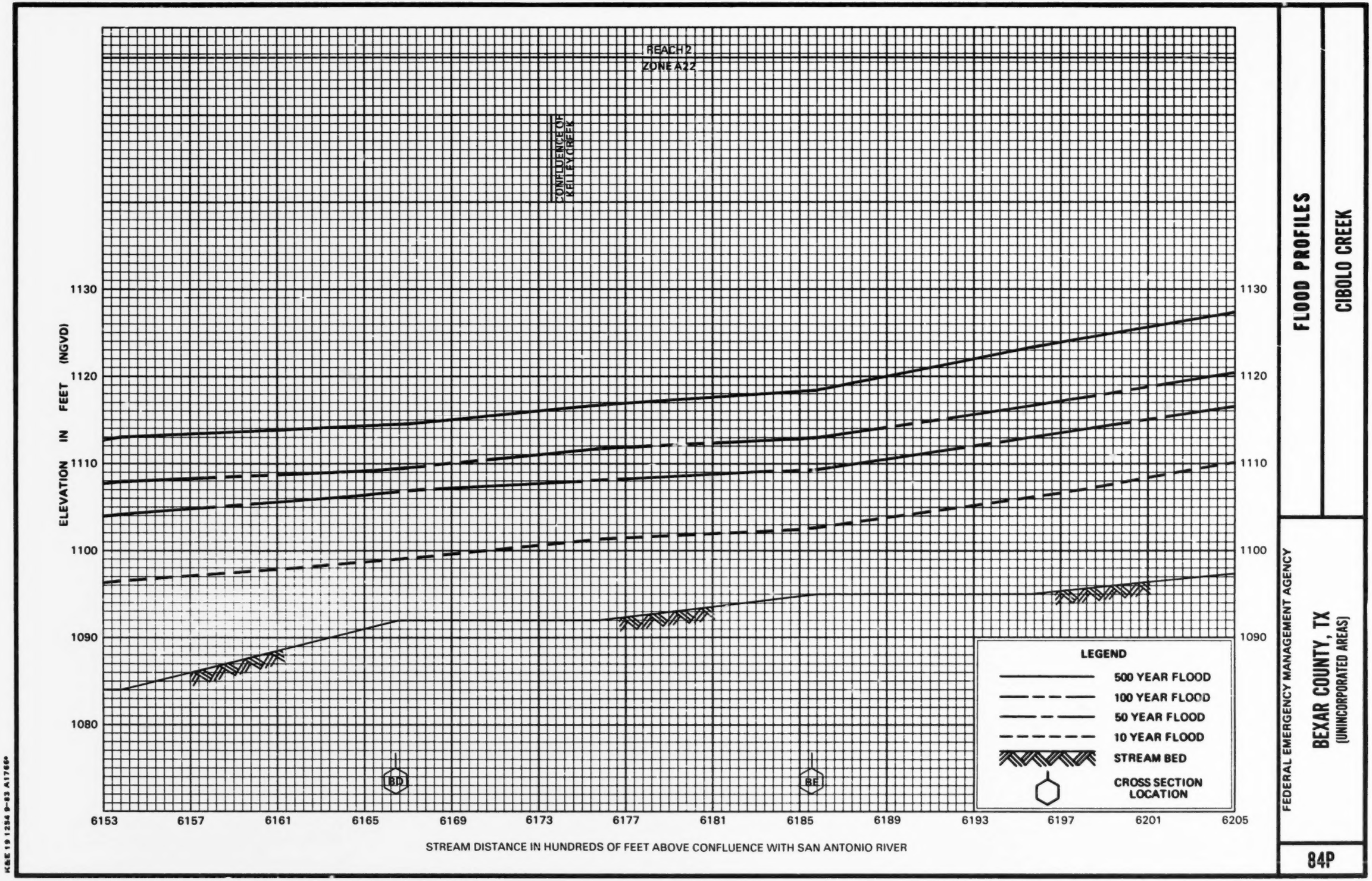
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

83P



FLOOD PROFILES

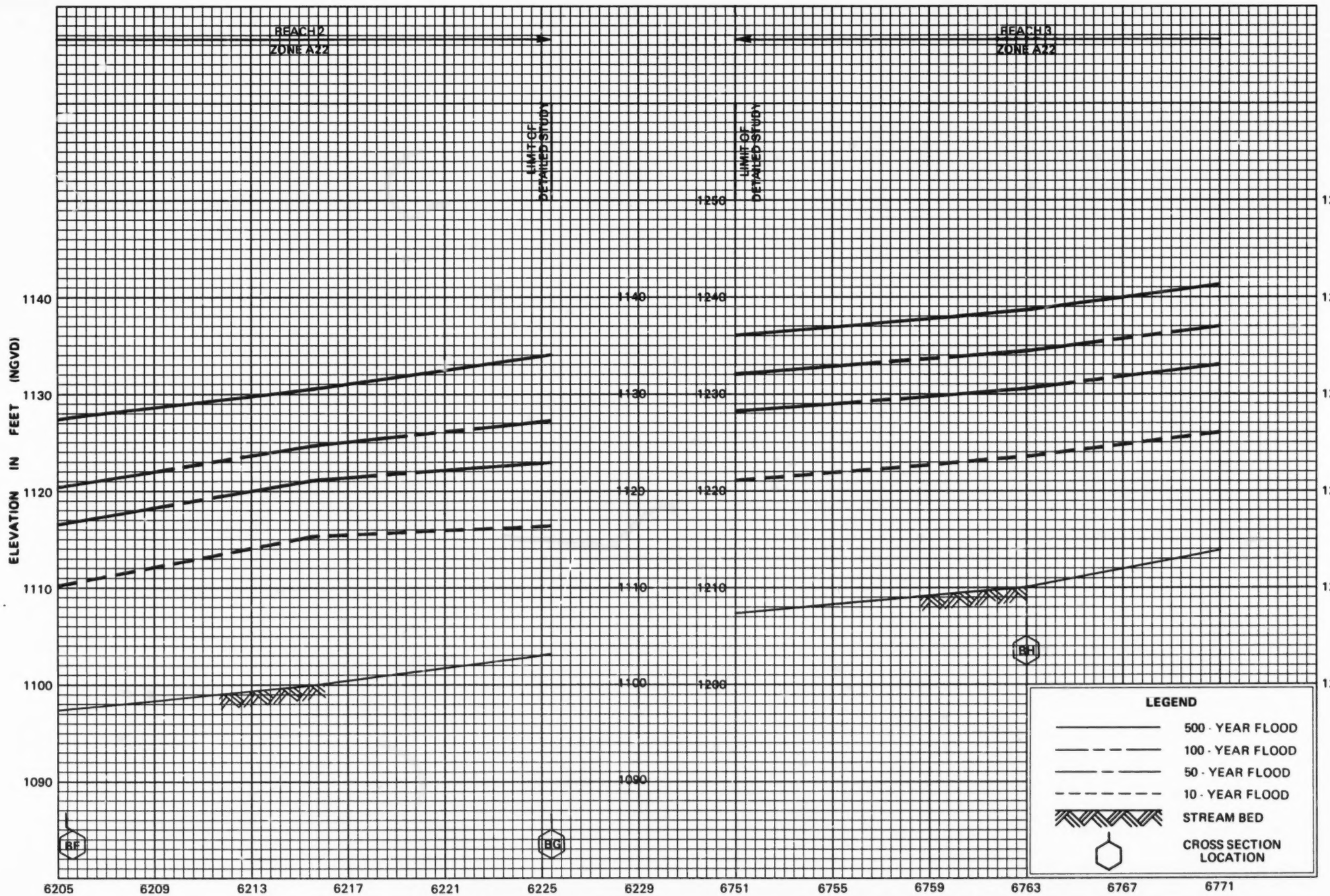
CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

84P

K&E 10 1284 9-83 A1766



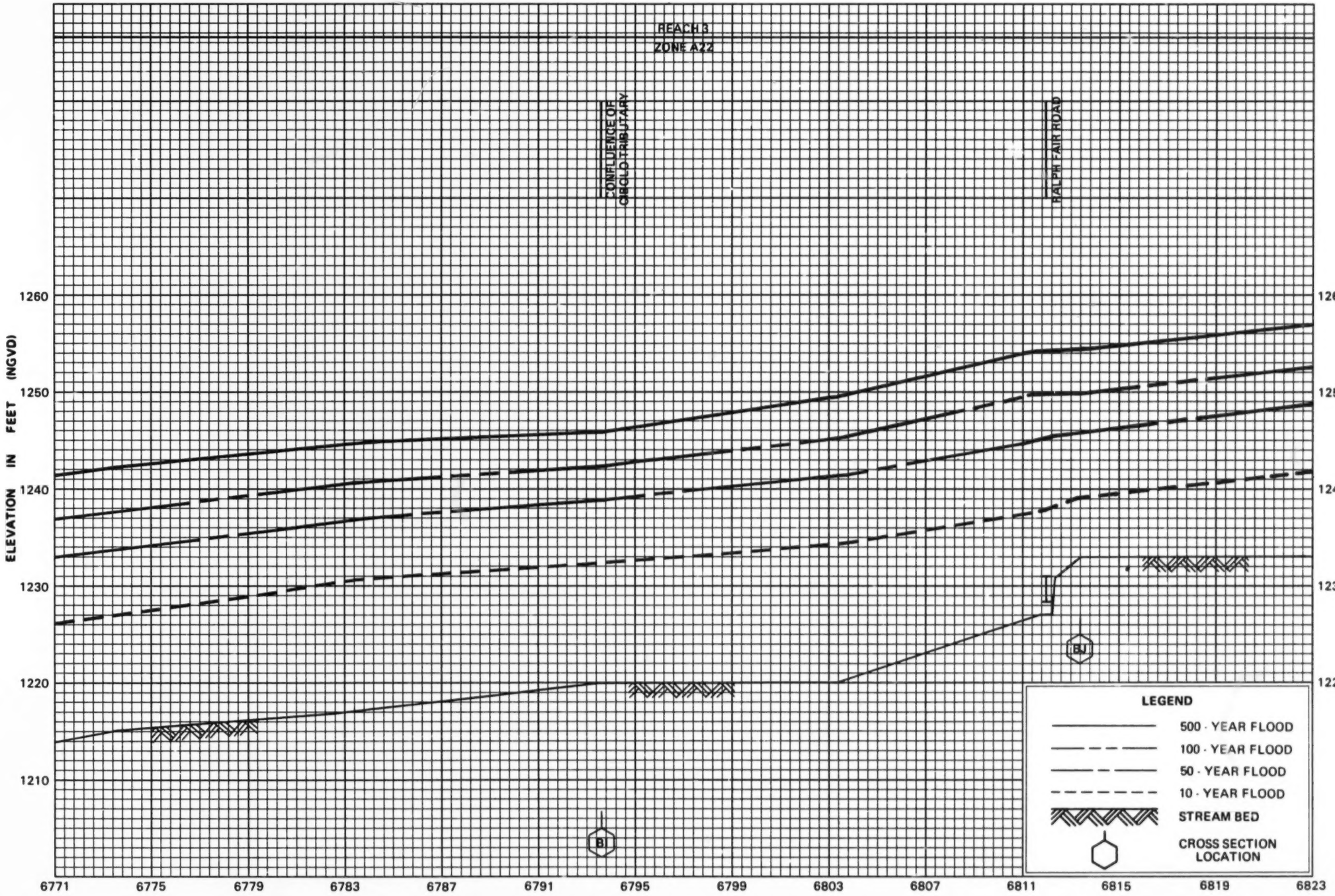
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

85P



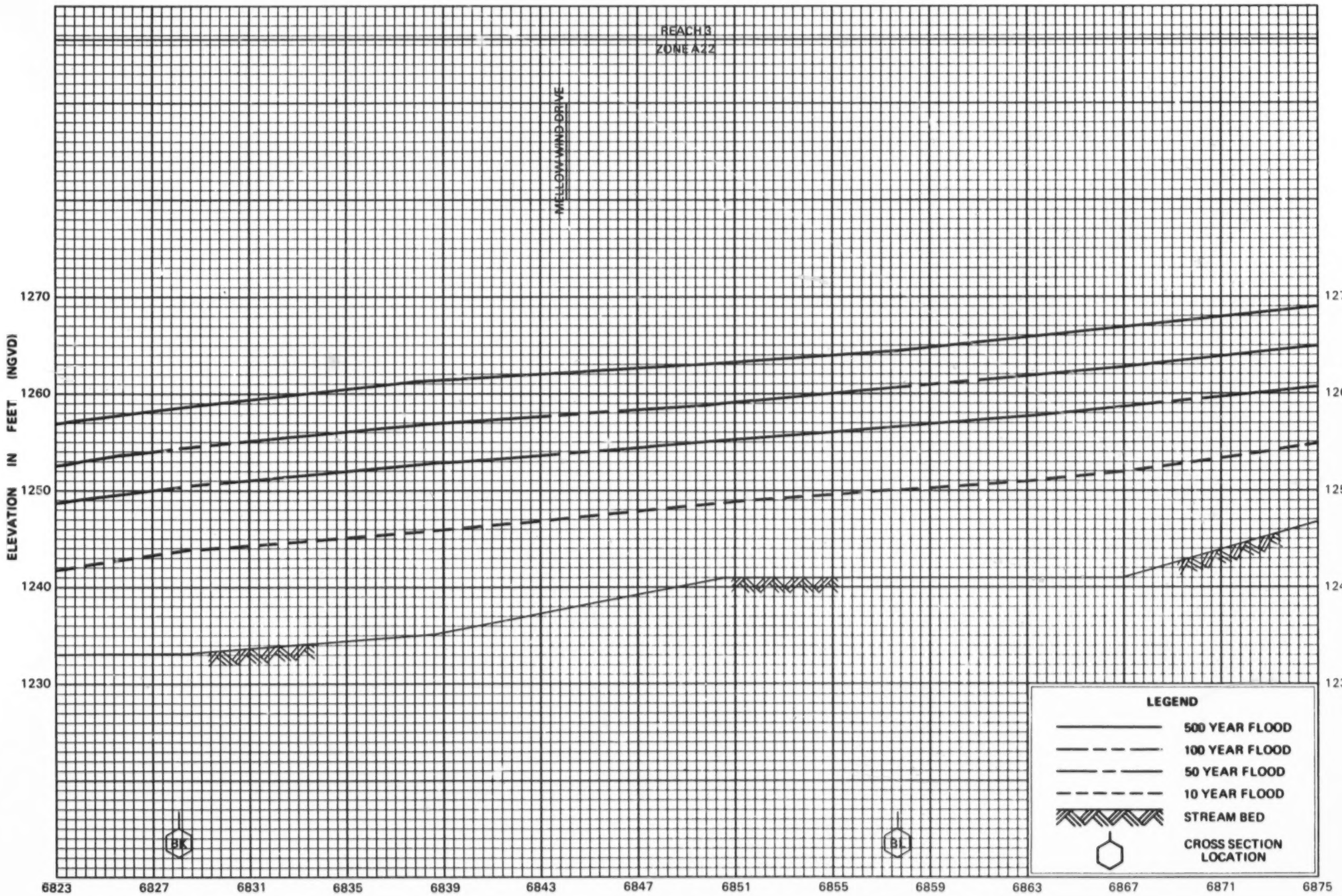
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

86P



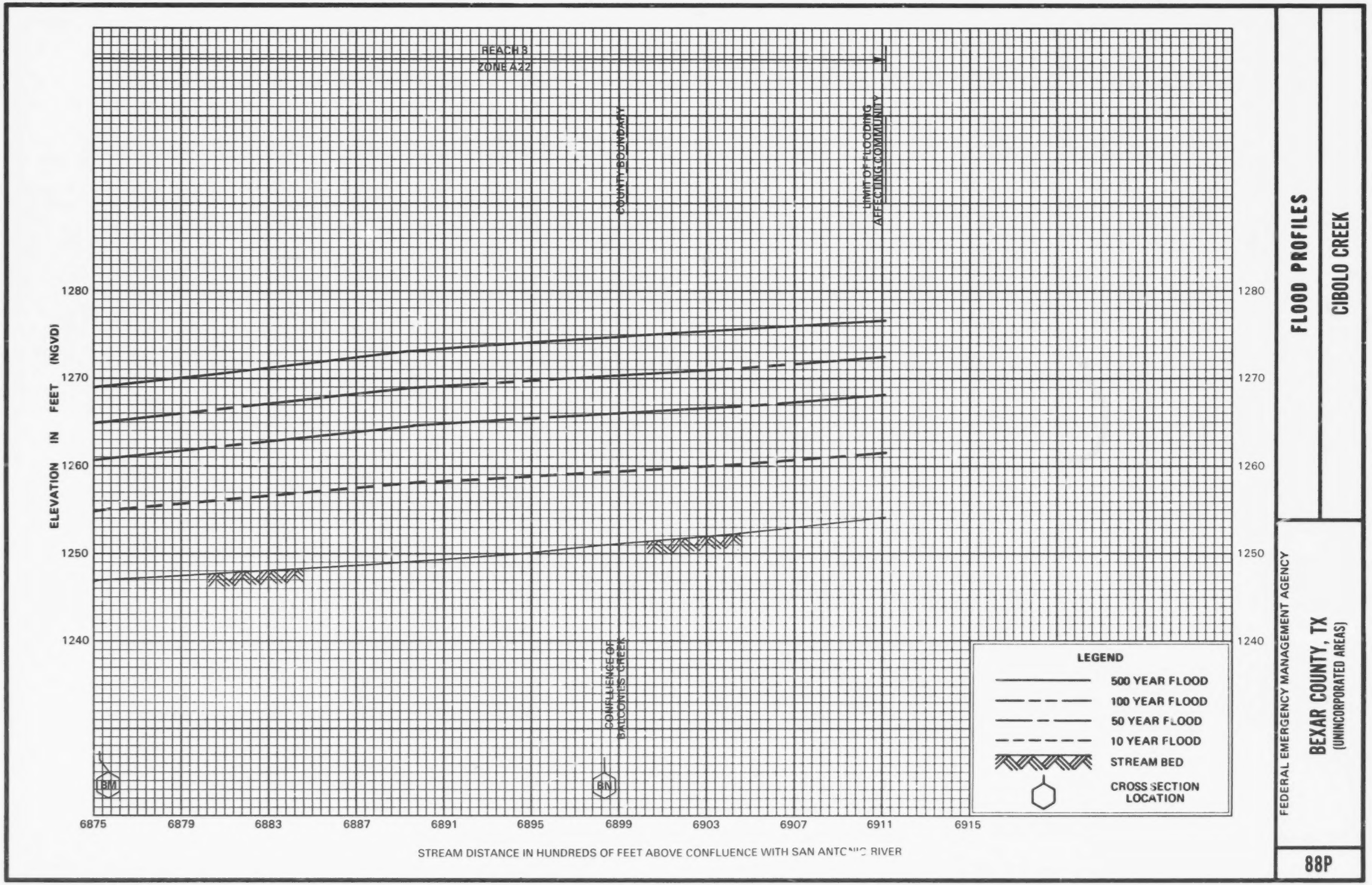
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

87P



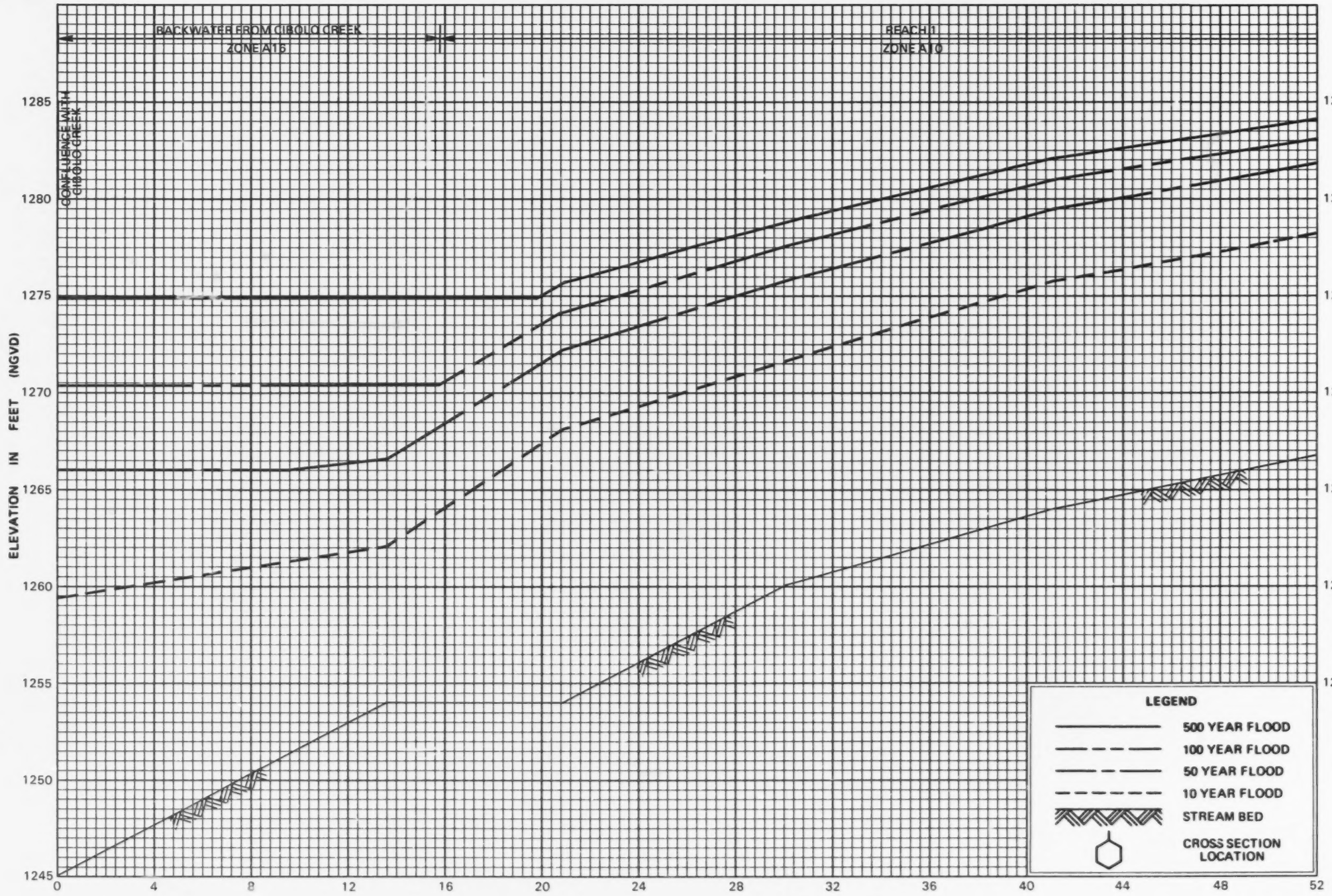
FLOOD PROFILES

CIBOLO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

88P



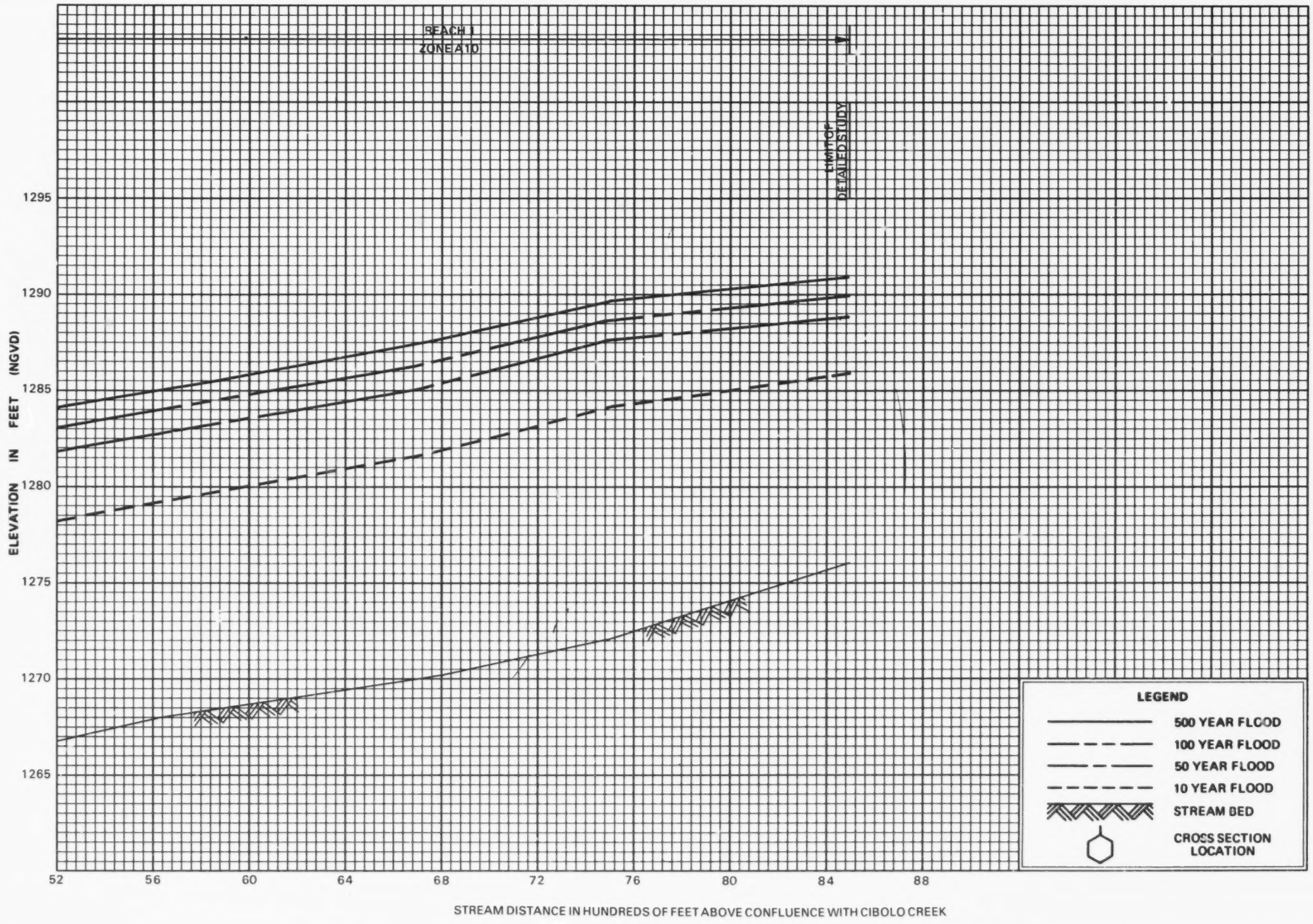
FLOOD PROFILES

BALCONES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

89P



FLOOD PROFILES

BALCONES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEXAR COUNTY, TX
(UNINCORPORATED AREAS)

90P